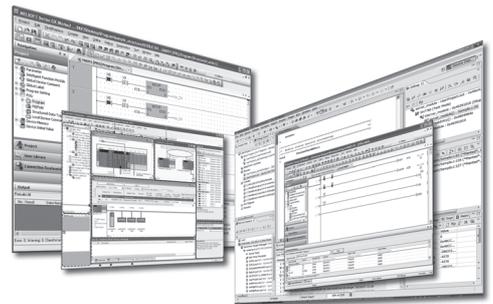




MELSOFT

GX VideoViewer Version 1 Operating Manual

-SW1DNN-REPROA-M (GX VideoViewer)
-SW1DND-REPROAA-M (GX VideoViewer Pro)



SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully, and pay full attention to safety to handle the product correctly. If products are used in a different way from that specified by manufacturers, the protection function of the products may not work properly.

The precautions given in this manual are concerned with this product only. For the safety precautions for the programmable controller system, refer to the user's manual for the module used and MELSEC iQ-R Module Configuration Manual.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

 WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
 CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Security Precautions]

-  **WARNING**
- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.
-

CONDITIONS OF USE FOR THE PRODUCT

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;

- i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
- ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.

("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi Electric may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi Electric and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTS are required. For details, please contact the Mitsubishi Electric representative in your region.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

INTRODUCTION

Thank you for your patronage. We appreciate your purchase of the engineering software, MELSOFT series.

This manual is designed for users to understand operations of GX VideoViewer and GX VideoViewer Pro.

Before using the product, please read this manual carefully and develop familiarity with the functions and performance of GX VideoViewer and GX VideoViewer Pro to handle the product correctly.

This manual explains the common functions of GX VideoViewer and GX VideoViewer Pro, and the dedicated function of GX VideoViewer Pro.

The dedicated function of GX VideoViewer Pro is not available in GX VideoViewer.

Note that the menu names and operating procedures may differ depending on an operating system in use and its version.

When reading this manual, replace the names and procedures with the applicable ones as necessary.

MEMO

CONTENTS

SAFETY PRECAUTIONS	1
CONDITIONS OF USE FOR THE PRODUCT	2
INTRODUCTION	3
RELEVANT MANUALS	7
TERMS	8
GENERIC TERMS AND ABBREVIATIONS	8

PART 1 FUNDAMENTALS OF GX VideoViewer/Pro

CHAPTER 1 OVERVIEW	10
1.1 Common Functions	11
1.2 Pro Dedicated Function	13
CHAPTER 2 OPERATING ENVIRONMENT	14
2.1 Operating Environment	14
CHAPTER 3 OBTAINING AND START OF GX VideoViewer/Pro	16
3.1 Obtaining of GX VideoViewer/Pro	16
Obtaining GX VideoViewer	16
Obtaining GX VideoViewer Pro	16
3.2 Installation and Uninstallation	16
3.3 Start and End	17
3.4 Switching Display Language	18
CHAPTER 4 HELP MENU	19
4.1 Opening Manual	19
4.2 Connecting to MITSUBISHI ELECTRIC FA Global Website	19
4.3 Version Information	19

PART 2 COMMON FUNCTIONS

CHAPTER 5 FLOW OF PLAYING A VIDEO FILE	22
CHAPTER 6 PLAYING A VIDEO FILE	24
6.1 GX VideoViewer/Pro Common Window	24
Main window	24
Edit comment/color screen	27
Menu configuration	28
6.2 Playing a Video File	29
6.3 Adding/Deleting a Log Marker	33
Reading a log marker information file	34

PART 3 Pro DEDICATED FUNCTION

CHAPTER 7 FLOW OF AI ANALYSIS	38
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CHAPTER 8	GENERATING A LEARNING MODEL	41
8.1	Model Generation Window	41
	Detailed setting screen	43
	Menu configuration	45
8.2	Generating a Learning Model	46
	Setting learning parameters	46
	Generating a learning model	51
CHAPTER 9	EXTRACTING A DIFFERENCE	52
9.1	Difference Extraction Window	52
	Menu configuration	55
9.2	Extracting a Difference	56
	Extracting a difference	56
	Adjusting the extraction result	58
	Saving the extraction result	60
APPENDIX		61
Appendix 1	Additions and Changes from Previous Version	61
Appendix 2	TROUBLESHOOTING	64
Appendix 3	Open Source Software	67
	Software information (GX VideoViewer Pro)	67
REVISIONS		75
TRADEMARKS		76
LICENSE		76
COPYRIGHTS		76

RELEVANT MANUALS

Manual name [manual number]	Description	Available form
GX VideoViewer Version 1 Operating Manual [SH-082370ENG] (this manual)	Basic operations and method for playing a video file in GX VideoViewer and GX VideoViewer Pro	e-Manual PDF
GX Works3 Operating Manual [SH-081215ENG]	System configurations, parameter settings, and operation methods for the online function in GX Works3	e-Manual PDF
GX LogViewer Version 1 Operating Manual [SH-080915ENG]	Basic operations of GX LogViewer and system configurations, functions, and operation methods of devices, software, or files to display data in GX LogViewer	Print book e-Manual PDF
MELSEC iQ-R System Recorder User's Manual (Startup) [SH-082279ENG]	Specifications, procedures for operation, and system configuration of System Recorder, and specifications of a recorder module/camera recorder module	Print book e-Manual PDF
MELSEC iQ-R System Recorder User's Manual (Application) [SH-082281ENG]	Functions, parameter settings, recording settings, and troubleshooting of System Recorder, and detailed specifications of a recorder module/camera recorder module	Print book e-Manual PDF
Camera Recording Package User's Manual [BCN-P5999-1324]	Network camera settings, programmable controller settings, and function blocks for the camera recording function	e-Manual PDF

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- Hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
AI analysis	A function to generate a learning model from a video file of the normal operation and extract a difference by comparing the learning model with an image at error occurrence
Difference extraction	A function to display a difference in an image and the difference occurrence time by comparing a video file at error occurrence with a learning model
Learning model	A model generated by extracting the features of appearance and operation from a video file of the normal operation. This model is used for comparison with a video file at error occurrence.
Model generation	A function to generate a learning model by setting learning parameters for a video file of the normal operation

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
GX VideoViewer/Pro	GX VideoViewer and GX VideoViewer Pro
Pro	GX VideoViewer Pro
Windows® 10 or later	Windows 10 and Windows 11

PART 1

FUNDAMENTALS OF GX VideoViewer/Pro

This part explains the overview and basic operations of GX VideoViewer/Pro.

1 OVERVIEW

2 OPERATING ENVIRONMENT

3 OBTAINING AND START OF GX VideoViewer/Pro

4 HELP MENU

1 OVERVIEW

GX VideoViewer/Pro plays a video file generated by using a camera recorder module or Camera Recording Package.

For details on a camera recorder module, refer to the following:

📖 MELSEC iQ-R System Recorder User's Manual (Startup)

📖 MELSEC iQ-R System Recorder User's Manual (Application)

For details on Camera Recording Package, refer to the following:

📖 Camera Recording Package User's Manual

Refer to the manual of each module to check whether a module used for generating a video file supports GX VideoViewer/Pro.

GX VideoViewer and GX VideoViewer Pro are updated tools of Video Verification Tool.

Along with the upgrade, the product name is changed to GX VideoViewer and GX VideoViewer Pro.

Function list

The following table shows the functions of GX VideoViewer/Pro.

Some functions are only available in GX VideoViewer Pro.

○: Supported, ×: Not supported

Function		GX VideoViewer	GX VideoViewer Pro	Reference
Common functions	Playing a video file	○	○	Page 11 Playing a video file
	Adding a log marker	○	○	Page 12 Adding a log marker
Pro dedicated function	Analyzing a video file with AI (model generation/difference extraction)	×	○	Page 13 Analyzing a video file with AI (model generation/difference extraction)

1.1 Common Functions

This section explains the features of the common functions of GX VideoViewer/Pro.

A video can be checked on a personal computer on which GX Works3 is not installed by using GX VideoViewer/Pro.
(Example: A field operator can check a video which was recorded when a program was executed.)

Moreover, 'log marker' can be added as a mark to an image to be checked.

The added log markers can be shared between users and between engineering tools.

Playing a video file

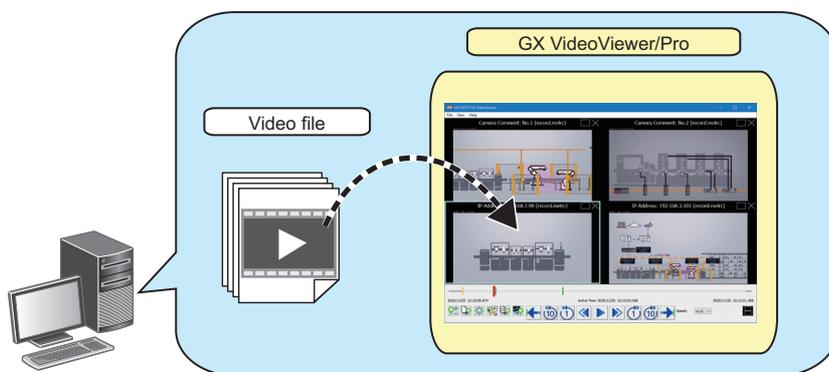
A video file can be opened, and an image in the video file can be displayed. ( Page 32 Opening a video file)

Playing up to four video files synchronizing their time in one screen is useful to check the related images at once.

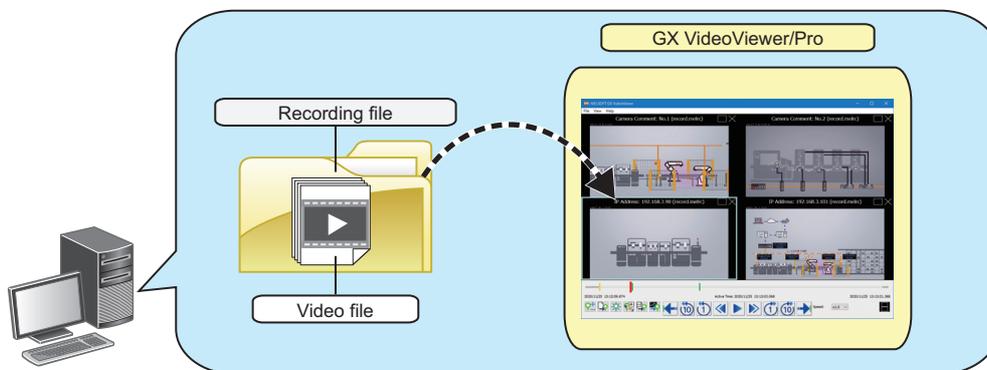
In addition, a video file included in a recording file can be opened, and an image in the video file generated by using a camera recorder module can be displayed. ( Page 31 Opening a video file included in a recording file (*.melrc))

Video can be played forward or backward frame by frame, while playing a video file.

■Video file



■Video file included in a recording file



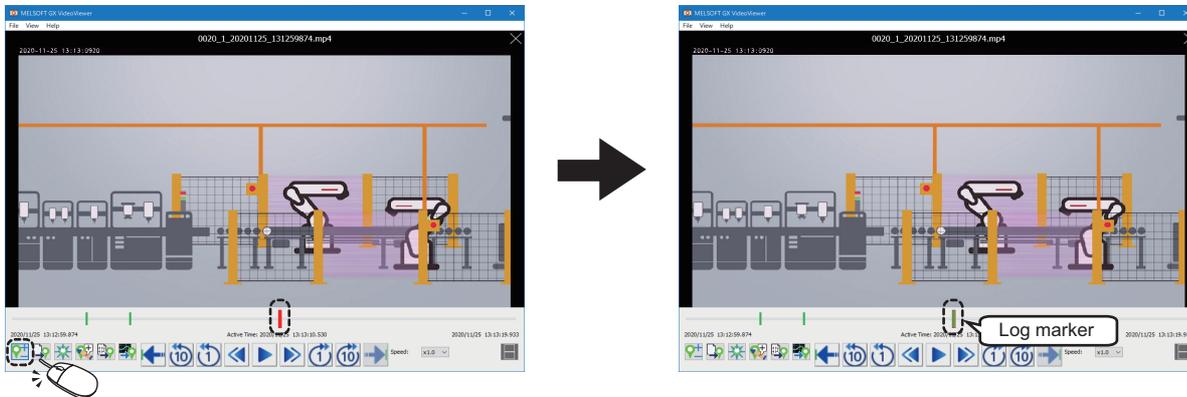
Adding a log marker

■ Adding a log marker

A log marker can be added to any image while playing a video file. (☞ Page 33 Adding/Deleting a Log Marker)

Adding a log marker to an image to be checked is useful for analyzing the image.

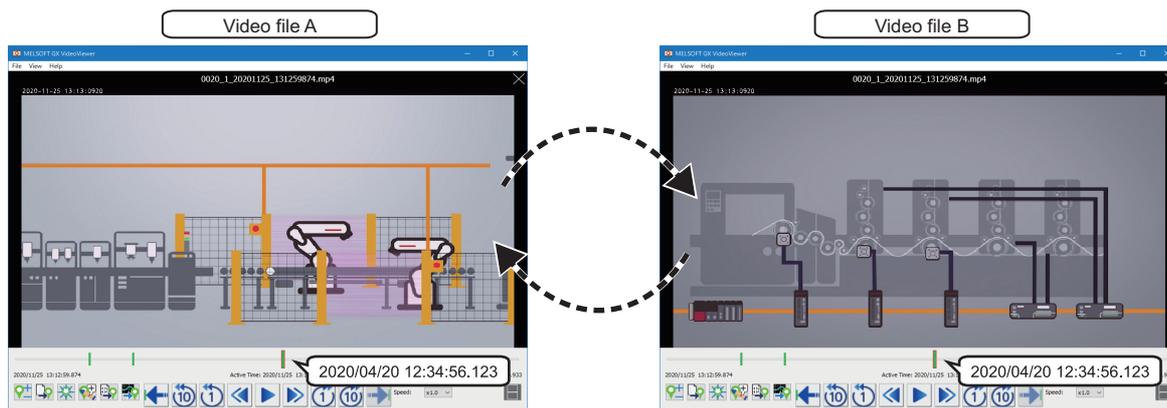
In addition, adding a comment to a log marker is useful to share information of the image among multiple users.



■ Applying log markers to another video file

Added log markers can be applied to another video file. (☞ Page 34 GX VideoViewer/Pro)

Applying the log markers to another video file is useful for checking an image in the file recorded at the same time as the one to which the markers were added.

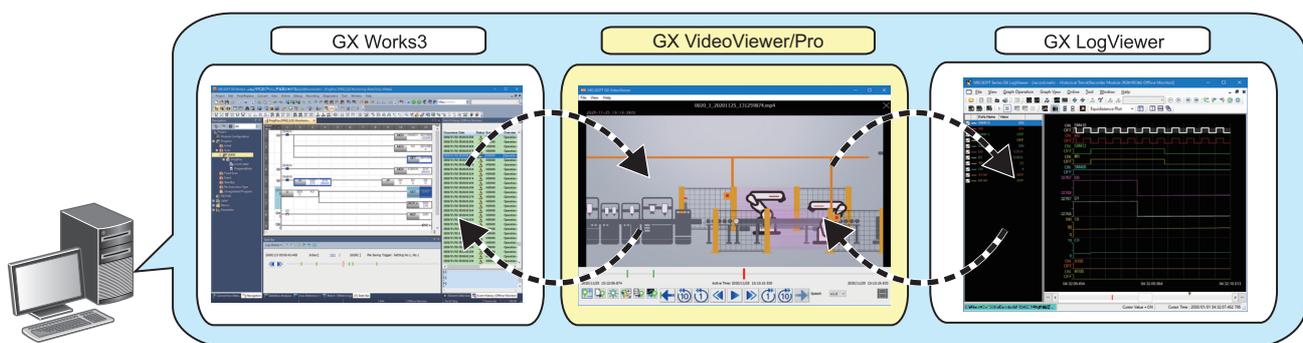


■ Applying log markers to GX Works3/GX LogViewer

Log markers added to a video file in GX VideoViewer/Pro can be applied to a recording file or data logging file in GX Works3 and GX LogViewer. (☞ Page 35 GX Works3, Page 35 GX LogViewer)

Moreover, log markers added to a recording file or data logging file in GX Works3 and GX LogViewer can be applied to a video file in GX VideoViewer/Pro. (☞ Page 34 GX VideoViewer/Pro)

Applying the same log markers to each file is useful for checking the operation of a program, an event history, and a device or label value of when an image to be checked was recorded.

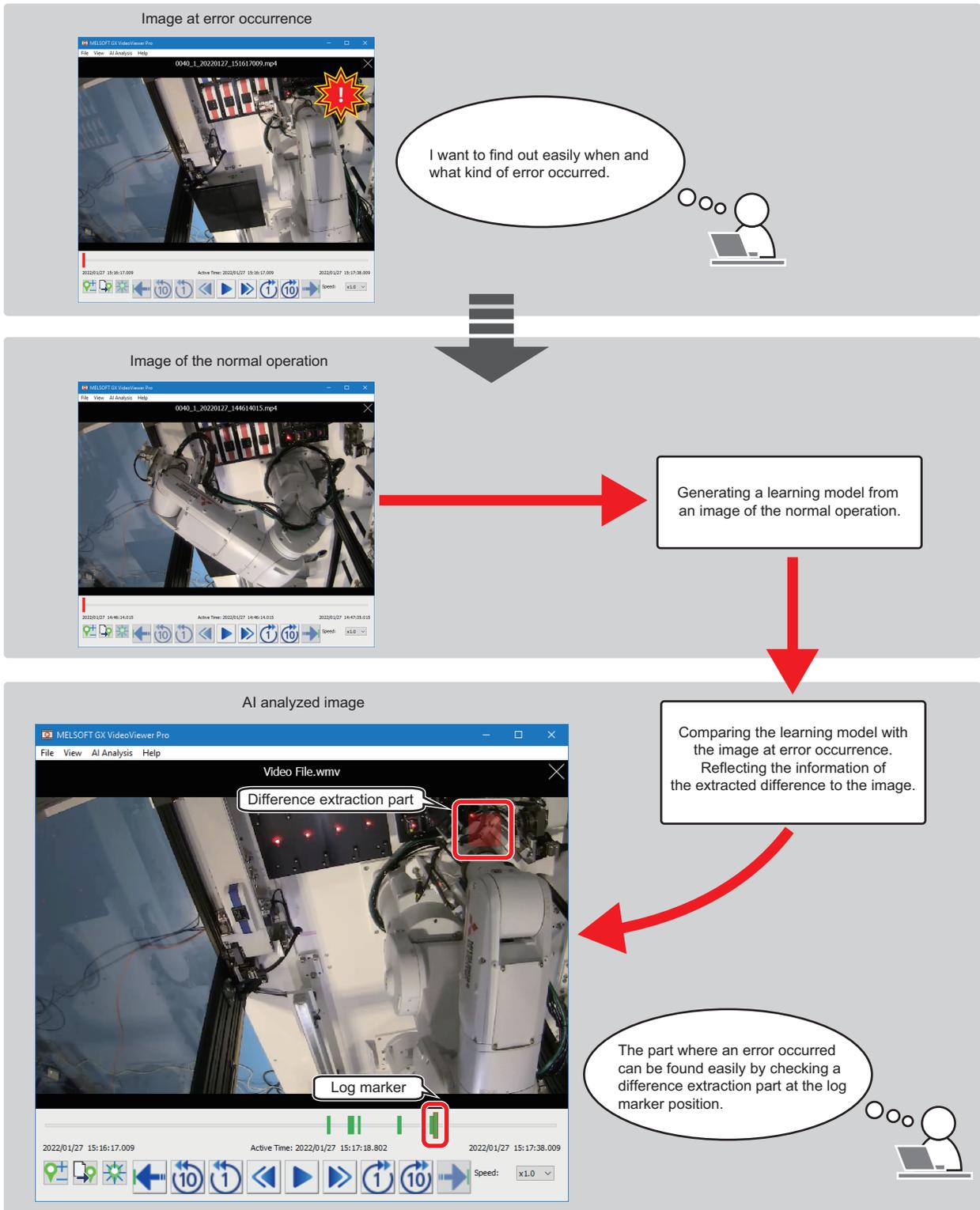


1.2 Pro Dedicated Function

This section explains the feature of the dedicated function of GX VideoViewer Pro.

Analyzing a video file with AI (model generation/difference extraction)

A learning model can be generated from a video file of the normal operation, and a difference can be extracted by comparing the learning model and a video file at error occurrence. (👉 Page 38 FLOW OF AI ANALYSIS)



2 OPERATING ENVIRONMENT

This chapter shows the operation environment of GX VideoViewer/Pro.

2.1 Operating Environment

For details on the operation environment of GX VideoViewer/Pro, refer to the following:

 GX VideoViewer Installation Instructions (BCN-P5999-1374)

 GX VideoViewer Pro Installation Instructions (BCN-P5999-1553)

The above manuals are stored in the "Manual" folder which is stored in the same folder as each installer.

3 OBTAINING AND START OF GX VideoViewer/Pro

3.1 Obtaining of GX VideoViewer/Pro

Obtaining GX VideoViewer

In Japan

GX VideoViewer can be downloaded from the Mitsubishi Electric FA website.

www.MitsubishiElectric.co.jp/fa

For downloading GX VideoViewer, please register for a free membership on the Mitsubishi Electric FA website in advance.

In other countries

For the information on how to obtain GX VideoViewer, please contact your local Mitsubishi Electric sales office or representative.

Obtaining GX VideoViewer Pro

For the information on how to obtain GX VideoViewer Pro, please contact your local Mitsubishi Electric sales office or representative.

3.2 Installation and Uninstallation

For the installation/uninstallation procedure of GX VideoViewer/Pro, refer to the following:

 GX VideoViewer Installation Instructions (BCN-P5999-1374)

 GX VideoViewer Pro Installation Instructions (BCN-P5999-1553)

The above manuals are stored in the "Manual" folder which is stored in the same folder as each installer.

3.3 Start and End

This section shows the operation procedure for starting and ending GX VideoViewer/Pro.

Start

Operating procedure

■ Windows menu

Start GX VideoViewer/Pro from "MELSOFT" in Windows Start.

■ GX Works3 menu

Select the following menu of GX Works3:

- [Tool] ⇒ [GX VideoViewer]

When starting GX VideoViewer/Pro from GX Works3 Version 1.070Y or later, the slider, log markers and trigger position markers in a recording file/data logging file that is opened in GX Works3 are applied to a video file to be opened in GX VideoViewer/Pro.

Point

If the following operation is performed in GX Works3 Version 1.072A or later, the "Select Video" screen appears with a recording file being monitored offline is specified.

Therefore, a video file can be selected without specifying the recording file manually.

- Starting GX VideoViewer/Pro from the menu after starting offline monitoring for a recording file including a video file

■ Starting GX VideoViewer/Pro by specifying the display position and window size

The display position and window size of GX VideoViewer/Pro at startup can be specified by specifying the following options in a command line.

- To start in full screen
-WINDOWSIZE
- To start by specifying the display position (left*1, top*2) and window size (width, height)
-WINDOWSIZE=left,top,width,height

*1 For 'left,' enter an integer value by taking the upper left of the main display as the coordinates (0,0) and the rightward direction as positive.

When specifying '0,' the window frame is displayed transparently by Windows settings; therefore, a gap appears for a few pixels on the left side of the main display.

(This can be avoided by turning high contrast mode ON in Windows settings.)

*2 For 'top,' enter an integer value by taking the upper left of the main display as the coordinates (0,0) and the downward direction as positive.

Ex.

When starting GX VideoViewer/Pro from the command prompt, specify the installation path of GX VideoViewer/Pro and option as follows.

When starting GX VideoViewer from a shortcut, specify an option in "Target" in the shortcut properties as follows.

- To start in full screen
"C:\Program Files\MELSOFT\REPROA\GVViewer.exe" "-WINDOWSIZE"
- To start at the specified display position and in the specified window size, and open a recording file (D:\Files\1TS01_001\record.melrc)
"C:\Program Files\MELSOFT\REPROA\GVViewer.exe" "-WINDOWSIZE=10,20,1500,1000" "D:\Files\1TS01_001\record.melrc"

End

Operating procedure

Select [File] ⇒ [Exit].

3.4 Switching Display Language

GX VideoViewer/Pro supports multiple languages, and therefore the display language such as one on the menu can be switched on a personal computer.

Operating procedure

1. Select [View] ⇒ [Switch Display Language].

The "Switch Display Language" screen appears.

2. Select the display language from the pull-down list, and click the [OK] button.

Precautions

- If the display language differs from the one for the operating system, displayed texts may get cut.
- If GX VideoViewer Pro is restarted without closing the "Model Generation" window or "Difference Extraction" window after switching the display language, only the display language of the main window of GX VideoViewer Pro is switched, and that of the "Model Generation" window or "Difference Extraction" windows is not switched.

4 HELP MENU

4.1 Opening Manual

Open the operating manual of GX VideoViewer/Pro.

Operating procedure

Select [Help] ⇒ [Open Manual].

4.2 Connecting to MITSUBISHI ELECTRIC FA Global Website

Open the MITSUBISHI ELECTRIC FA Global Website in a web browser.

Make sure your personal computer connect to the Internet in advance.

Operating procedure

Select [Help] ⇒ [Connection to MITSUBISHI ELECTRIC FA Global Website].

4.3 Version Information

Display the version information of GX VideoViewer/Pro.

Operating procedure

Select [Help] ⇒ [About GX VideoViewer].

MEMO

This part explains the operation methods of the common functions.

5 FLOW OF PLAYING A VIDEO FILE

6 PLAYING A VIDEO FILE

5 FLOW OF PLAYING A VIDEO FILE

This chapter explains the operation flow to check video of a video file by using GX VideoViewer/Pro.

1. Start GX VideoViewer/Pro. (☞ Page 17 Start)
2. Play a video file. (☞ Page 29 Playing a Video File)
3. Add a log marker to the video file. (☞ Page 33 Adding/Deleting a Log Marker)
4. Apply log markers added to a recording file or data logging file to the video file. (☞ Page 34 Reading a log marker information file)
5. Apply log markers added to the video file to the recording file or data logging file. (☞ Page 34 Reading a log marker information file)

6 PLAYING A VIDEO FILE

6.1 GX VideoViewer/Pro Common Window

This section explains the screen configuration of the common functions.

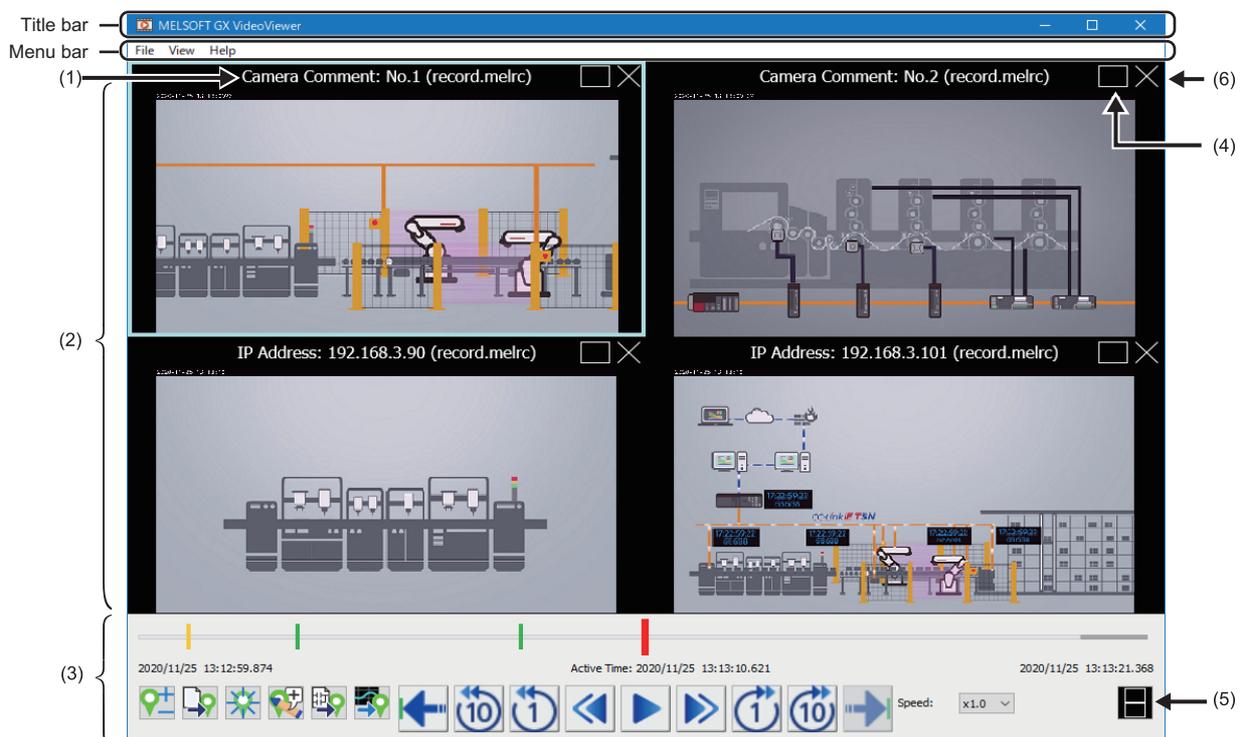
Main window

Window

Start GX VideoViewer/Pro. (☞ Page 17 Start)

Ex.

For GX VideoViewer



Displayed items

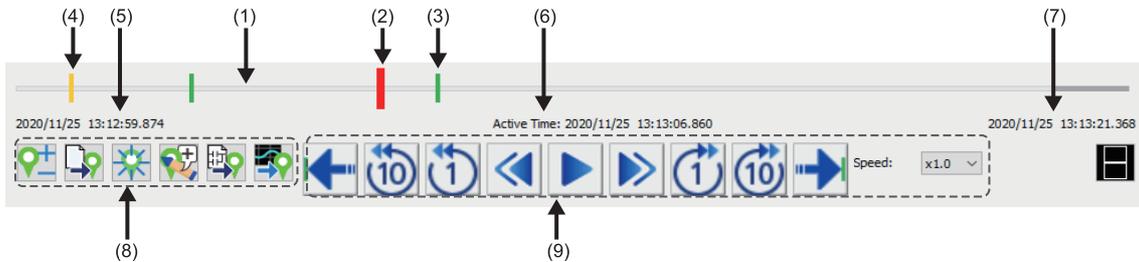
No.	Item	Description
(1)	Video file name	The video file name is displayed. When a camera comment is set to a video file included in a recording file, the camera comment is displayed. When no camera comment is set, an IP address is displayed.
(2)	Video display area	An image recorded at the time pointed by the slider is displayed. (Up to four video files can be displayed. By moving the slider, the image is updated. The display magnification of the image is adjusted automatically according to the size of the main window. (An aspect ratio is not changed.) One image can be selected from multiple images being displayed by clicking the image. The selected image is surrounded by a blue frame, and its seek bar is displayed in the seek bar area. When there is no image recorded at the displayed time, "No Image" is displayed.
(3)	Seek bar area	The seek bar is displayed. (☞ Page 25 Seek bar area) Icons for playing/pausing a video file or adding a log marker etc. are displayed.
(4)	 Tile multiple images  Enlarge image	Click this to tile multiple images. By clicking either of  /  (Switch Single/Double Column Display), whether to display the multiple images in a single column or double columns can be switched. Click this to enlarge a selected image from tiled images.

No.	Item	Description
(5)	Switch Single/Double Column Display	Click either of these to display multiple images in a single column or double columns.
(6)	Close	Click this to close an image being displayed. If an enlarged image is closed while playing multiple video files, other images are tiled.

Point

For GX VideoViewer Pro, the displayed menu items differ. (Page 28 Menu configuration)

Seek bar area



Displayed items

No.	Item	Description
(1)	Seek bar	The recording time range of the open video file is shown. By clicking the seek bar, the slider moves to the position clicked. When opening a video file included in a recording file, the recording time range of all the video files in the recording file is displayed, and that range of unopened video files is grayed out.
(2)	Slider	The position of an image being displayed in the video display area is shown. The slider is displayed in red on the seek bar. By dragging the slider to the left or right, the image is updated.
(3)	Log marker	An added log marker is shown. The log marker is displayed in specified color on the seek bar. (Page 27 Edit comment/color screen)
(4)	Trigger position marker	When opening a video file included in a recording file, trigger position markers in the recording file are displayed. When starting GX VideoViewer/Pro from GX Works3, trigger position markers in a recording file/ data logging file that is opened in GX Works3 are displayed. A trigger position marker is displayed in yellow on the seek bar.
(5)	Video Start Time	The recording start time acquired from an XML file in which time information of a video file is recorded is displayed when opening the video file. When opening a video file included in a recording file, the first recording start time among all the video files in the recording file is displayed. Format: YYYY/MM/DD hh:mm:ss.sss
(6)	Current Play Time	The time pointed by the slider is displayed. By moving the slider, the time is updated. Format: YYYY/MM/DD hh:mm:ss.sss
(7)	Video End Time	The time of the last frame is displayed. When opening a video file included in a recording file, the time of the last frame among all the video files in the recording file is displayed Format: YYYY/MM/DD hh:mm:ss.sss

No.	Item	Description	
(8)	Log marker operation	 Add/Delete Log Marker	Click this to add and delete a log marker. ( Page 33 Adding/Deleting a Log Marker)
		 Read Log Marker Information	Click this to read a log marker information file. ( Page 34 Reading a log marker information file)
		 Delete All Log Markers	Click this to delete all the log markers on the seek bar.
		 Edit Comment/Color of Log Marker	Click this to open the "Edit Comment/Color" screen. ( Page 27 Edit comment/color screen) In this screen, a comment can be added for a log marker and the color of a log marker can be changed.
		 Read Log Marker from GX Works3	Click this to apply log markers in a recording file/data logging file that is opened in GX Works3 to a video file that is opened in GX VideoViewer/Pro. The log markers can be applied only when any of the following conditions is satisfied: <ul style="list-style-type: none"> • GX VideoViewer/Pro is started from GX Works3 Version 1.070Y or later. • A video file included in a recording file to which log markers are added is opened.
		 Read Log Marker from GX LogViewer	Click this to apply log markers in a recording file/data logging file that is opened in GX LogViewer Version 1.121B or later to a video file that is opened in GX VideoViewer/Pro.
(9)	Playing/ seeking operation	 Previous Marker	Click this to move the slider to a previous log marker or trigger position marker.
		 Seek backward 10 seconds	Click this to move the slider to the position of an image 10 seconds before.
		 Seek backward one second	Click this to move the slider to the position of an image one second before.
		 Previous Frame	Click this to play a video file backward by one frame.
		 Play  Pause	Click this to play/pause a video file. While playing the video file,  (Pause) is displayed. While pausing the video file,  (Play) is displayed. A video file is stopped, if any other operation is performed in GX VideoViewer/Pro while playing the video file.
		 Next Frame	Click this to play a video file forward by one frame.
		 Seek forward one second	Click this to move the slider to the position of an image one second after.
		 Seek forward 10 seconds	Click this to move the slider to the position of an image 10 seconds after.
		 Next Marker	Click this to move the slider to a next log marker or trigger position marker.
		Speed	Set the speed to play a video file. This speed can be changed while playing the video file.

Point 

By clicking the  +  /  +  keys, the slider moves to the left or right.

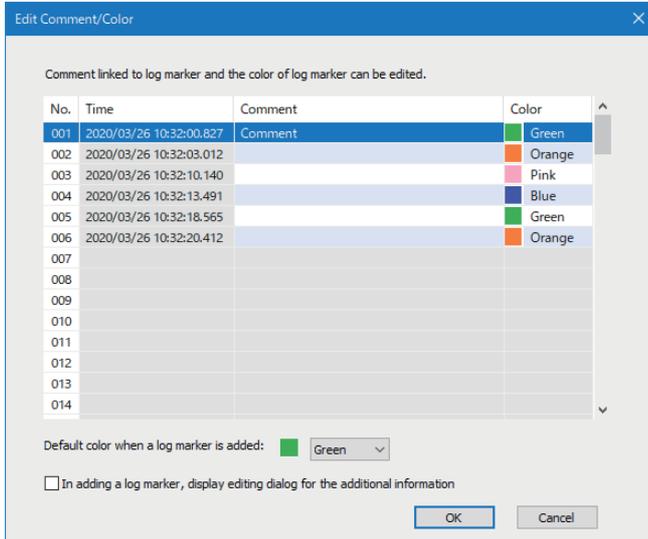
Edit comment/color screen

In the "Edit Comment/Color" screen, the following operations can be performed:

- Adding a comment for a log marker.
- Changing the color of a log marker.

Window

- Click  (Edit Comment/Color of Log Marker) in the seek bar area.
- Press the **Ctrl** + **E** keys.



Displayed items

Item	Description
Comment	Add a comment for a log marker. (Up to 256 characters) The added comment is displayed by placing the mouse cursor on the log marker.
Color	Change the color of a log marker.
Default color when a log marker is added	Set the default color for a new log marker.
In adding a log marker, display editing dialog for the additional information.	Select this checkbox to display the "Edit Comment/Color" screen every time adding a log marker.

Menu configuration

The following tables show menus of the main window.

[File]	Reference
⇒ [Open]	Page 29 Playing a Video File
⇒ [Select Video]	
⇒ [Close Selected Video File]	—
⇒ [Close All Video Files]	
⇒ [Exit]	Page 17 End
[View]	Reference
⇒ [Switch Display Language]	Page 18 Switching Display Language
[AI Analysis]^{*1}	Reference
⇒ [Model Generation]	Page 41 GENERATING A LEARNING MODEL
⇒ [Difference Extraction]	Page 52 EXTRACTING A DIFFERENCE
[Help]	Reference
⇒ [Open Manual]	Page 19 Opening Manual
⇒ [Connection to MITSUBISHI ELECTRIC FA Global Website]	Page 19 Connecting to MITSUBISHI ELECTRIC FA Global Website
⇒ [About GX VideoViewer]	Page 19 Version Information

*1 Dedicated menus for GX VideoViewer Pro.

6.2 Playing a Video File

Video file

The following table shows the specifications of a video file that can be played in GX VideoViewer/Pro.

■ Video file generated by using a camera recorder module

- *.mp4

Item	Description
File format	*.mp4
Maximum file size	800 MB
Compression type	H.264
Image resolution (pixels)	640 × 480, 1280 × 720, 1280 × 960, 1920 × 1080
Frame rate (fps)	10, 30, 120 ^{*1} , 180 ^{*1}

*1 Only the following resolutions are supported:

- VGA (640 × 480)
- HD (1280 × 720)

- *.mov

Item	Description
File format	*.mov
Maximum file size	800 MB
Compression type	MJPEG (Motion JPEG)
Image resolution (pixels)	640 × 480, 1280 × 960
Frame rate (fps)	10, 30, 120 ^{*1} , 200 ^{*1}

*1 Only the following resolution is supported:

- VGA (640 × 480)

■ Video file generated by using Camera Recording Package

Item	Description
File format	*.mkv
Maximum file size	2 GB
Image resolution (pixels)	320 × 240, 640 × 480, 1280 × 720, 1920 × 1080
Frame rate (fps)	10, 15, 25, 30, 50, 60, 100, 120

For details on a video file, refer to the following:

 MELSEC iQ-R System Recorder User's Manual (Application)

 Camera Recording Package User's Manual

■ Video file generated by using the difference extraction function of GX VideoViewer Pro

Item	Description
File format	*.wmv
Image resolution (pixels)	Refer to the specifications of a video file from which a difference is extracted (a video file generated by using a camera recorder module).
Frame rate (fps)	 Page 29 Video file generated by using a camera recorder module

Restrictions

The following table shows the restrictions when playing a video file.

No.	Description
1	<p>Only video file which satisfies the following conditions can be played.</p> <ul style="list-style-type: none"> • A video file is generated by using any of the following: <ul style="list-style-type: none"> · Camera recorder module · Camera Recording Package · Difference extraction function of GX VideoViewer Pro • An XML file in which time information is recorded is stored in the same folder as a video file. • The frame rate is recorded normally. (Not a fast-forwarding or slow-motion video.) • Images of a video are recorded continuously. • Any of the following operations is not performed: <ul style="list-style-type: none"> · Changing the configuration of a folder in which a video file is stored · Changing a file name · Editing a file
2	<p>Audio of a video file cannot be played in GX VideoViewer/Pro.</p>
3	<p>If a video file cannot be accessed due to some reasons such as network disconnection while playing the video file saved on a network drive or a removal media, an image is not displayed.</p> <p>In addition, when playing a video file on a network, the operation of GX VideoViewer/Pro may become slow since playing/seeking the video file requires time.</p>
4	<p>When playing/seeking a high-resolution video file, it may take time to display an image.</p> <p>To play/seek the video file smoothly, it is recommended to set the following contents when generating the video file:</p> <ul style="list-style-type: none"> • Video file of which compression type is MJPEG: If the resolution is HD (1280 × 720) or FHD (1920 × 1080), set the compression rate to 30 or higher. • Video file of which compression type is H.264: If the resolution is HD (1280 × 720) or FHD (1920 × 1080), set I-frame interval to the same value as frame rate.
5	<p>When installing GX VideoViewer/Pro on Windows 10 IoT Enterprise 2016 LTSB (including an industrial PC MELIPC), a video file compressed into MJPEG(Motion JPEG) format cannot be opened.</p>
6	<p>When a network camera manufactured by Axis Communications is set in Camera Recording Package, a decoder manufactured by a third party may be installed.</p> <p>In this case, GX VideoViewer/Pro may not operate normally.</p> <p>If such error occurs, uninstall the decoder manufactured by the third party.</p> <p>Example: When uninstalling a decoder manufactured by Axis Communications</p> <p>Delete all of the following files:</p> <ul style="list-style-type: none"> • C:\Program Files (x86)\Axis Communications\Components\AxMJPEGDec.dll • C:\Program Files (x86)\Axis Communications\Components\AxH264Dec.dll • C:\Program Files (x86)\Axis Communications\AXIS Media Control Embedded\AxMJPEGDec.dll • C:\Program Files (x86)\Axis Communications\AXIS Media Control Embedded\AxH264Dec.dll <p>Change 'C:\Program Files (x86)' according to the installation destination directory.</p>
7	<p>When the time of a CPU module is changed from the daylight saving time to the standard time while generating a video file, the time of an image in the video file is not changed. (This also applies when the time is changed from the standard time to the daylight saving time.)</p> <p>In this case, log markers and trigger position markers may not be applied normally.</p>

Playing a video file

■ Opening a video file included in a recording file (*.melrc)

The following explains the procedure for opening a video file included in a recording file, and displaying an image.

Operating procedure

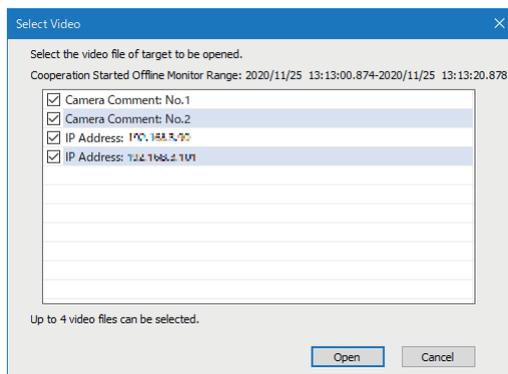
1. Start GX VideoViewer/Pro. (☞ Page 17 Start)
2. Perform any of the following operations:
 - Select a recording file in the "Open" screen, and click the [Open] button.
 - Drag and drop a recording file onto the main window.
3. Select the checkboxes of up to four video files in the "Select Video" screen, and click the [OK] button. Images in the video files are displayed in the main window.
4. Click  (Play) in the main window.

For the descriptions and operation methods of the main window, refer to the following:

☞ Page 24 Main window

Point

- The "Open" screen appears by selecting [File] ⇒ [Open].
- The "Select Video" screen appears by selecting [File] ⇒ [Select Video], and a video file to be opened can be changed.
- Information of a video file is displayed in the tooltip by placing the mouse cursor on each row in the "Select Video" screen.
- If a camera comment is set to the video file, the camera comment is displayed in the "Video Select" screen. If no camera comment is set, an IP address is displayed.



The camera comment and IP address can be set in the "Camera individual settings" screen of a module extended parameter of a camera recorder module.

For details on the "Camera individual settings" screen, refer to the following:

 MELSEC iQ-R System Recorder User's Manual (Application)

■ Opening a video file

The following explains the procedure for opening a video file and displaying an image.

Operating procedure

1. Start GX VideoViewer/Pro. (☞ Page 17 Start)
2. Perform any of the following operations:
 - Select a video file in the "Open" screen, and click the [Open] button.
 - Drag and drop a video file onto the main window.

An image in the video file is displayed in the main window.

3. Click  (Play) in the main window.

For the descriptions and operation methods of the main window, refer to the following:

☞ Page 24 Main window

Point

- The "Open" screen appears by selecting [File] ⇒ [Open].
- Up to four video files can be played synchronizing their time.
To open multiple video files, repeat step 2.

Precautions

The time of a video file played in GX VideoViewer/Pro is adjusted by an XML file in which time information is recorded.

Before playing the video file, make sure that the XML file is stored in the same folder as the video file.

When generating a video file by using a camera recorder module or Camera Recording Package, the XML file is generated at the same time.

6.3 Adding/Deleting a Log Marker

Adding a log marker

The following explains the procedure for adding a log marker to any image while playing a video file. Up to 100 log markers can be added to one video file.

Operating procedure

1. Move the slider to the position of an image at which a log marker is to be added.
2. Click  (Add/delete Log Marker).

The added log marker is saved in the folder where the video file is stored as a log marker information file (*.vms).

Point

In the "Edit Comment/Color" screen, the following operations can be performed: ( Page 27 Edit comment/color screen)

- Adding a comment for a log marker.
- Changing the color of a log marker.

Deleting a log marker

The following explains the procedure for deleting an added log marker.

Operating procedure

1. Move the slider to a log marker to be deleted.
2. Click  (Add/delete Log Marker).

Point

- By clicking  (Previous Marker)/, the slider can be moved to a log marker or trigger position marker.
- By clicking , all the log markers in the video file are deleted.

Reading a log marker information file

Log markers added to a video file, recording file, or data logging file can be applied to another file by reading a log marker information file in GX VideoViewer/Pro, GX Works3 and GX LogViewer.

A log marker information file is generated when adding log markers in each tool.

The extension of a log marker information file differs as follows depending on the tool used to add log markers:

Extension	Tool	Version of the tool
*.lms	GX Works3	Version 1.065T and 1.066U
	GX LogViewer	Version 1.106K
*.lmcs	GX Works3	Version 1.070Y or later
	GX LogViewer	Version 1.112R or later
*.vms	GX VideoViewer/Pro	—

Restrictions

The following table shows the restrictions when reading a log marker information file.

No.	Description
1	Do not perform the following operations to a log marker information file saved in the same folder as a video file. Doing so may result in the failure to read the log marker information file properly. <ul style="list-style-type: none">• Editing a file directly• Changing the access right
2	If a video file saved on a network drive is opened by another user at the same time, a log marker information file may be overwritten by the user. When the log marker information file is overwritten, added log markers may be deleted.
3	When the time of a CPU module is changed from the standard time to daylight saving time while generating a video file, recording file, and data logging file, the change is applied to the recording file and data logging file, but not to the video file. (This also applies when the time is changed from daylight saving time to the standard.) Therefore, when reading a log marker information file of the video file in GX Works3 or GX LogViewer, log markers may not be applied properly.

GX VideoViewer/Pro

Log markers which are added to a recording file, data logging file, or other video file can be applied to a video file by reading a log marker information file in GX VideoViewer/Pro.

The following explains the procedure for reading a log marker information file.

Operating procedure

1. Open a video file to which log markers are to be applied. (☞ Page 29 Playing a Video File)
2. Click  (Read Log Marker Information).
3. Select a log marker information file, and click the [Open] button.

Point

By clicking either of the following icons, log markers in a recording file/data logging file that is opened in GX Works3 and GX LogViewer can be applied to a video file that is opened in GX VideoViewer/Pro.

-  (Read Log Marker from GX Works3): Log markers can be applied only when starting GX VideoViewer/Pro from GX Works3 Version 1.070Y or later.
-  (Read Log Marker from GX LogViewer): Log markers can be applied only when opening a file in GX LogViewer Version 1.121B or later.

Precautions

- If the total number of log markers which are already added to the video file and ones to be applied exceeds 100, the log marker information file can not be read.
- Even when reading the log marker information file, the comments and colors of log markers which are already added to the video file are not overwritten.

GX Works3

Log markers which are added to a video file can be applied to a recording file or data logging file by reading a log marker information file in GX Works3.

To perform this operation, use GX Works3 Version 1.065T or later.

For the operation methods of GX Works3, refer to the following:

 GX Works3 Operating Manual

GX LogViewer

Log markers which are added to a video file can be applied to a recording file or data logging file by reading a log marker information file in GX LogViewer.

To perform this operation, use GX LogViewer Version 1.106K or later.

For the operation methods of GX LogViewer, refer to the following:

 GX LogViewer Version 1 Operating Manual

MEMO

PART 3

Pro DEDICATED FUNCTION

This part explains the operation methods of the dedicated function for Pro.

7 FLOW OF AI ANALYSIS

8 GENERATING A LEARNING MODEL

9 EXTRACTING A DIFFERENCE

7 FLOW OF AI ANALYSIS

This chapter shows the operation flow to analyze a video file with AI by using GX VideoViewer Pro.

To analyze a video file with AI, a video file of the normal operation needs to be acquired in advance by using a camera recorder module.

For details, refer to the following:

📖 MELSEC iQ-R System Recorder User's Manual (Application)

Start



1. Displaying the model generation window

📖 Page 41 Model Generation Window



2. Setting learning parameters

Set a video file to generate a learning model.

Set the learning range.

Set a subject filter.

Set a model compression rate.

📖 Page 46 Setting a video file

📖 Page 47 Setting the learning range

📖 Page 49 Setting a subject filter/frame skip

📖 Page 50 Setting a model compression rate



3. Generating a learning model

📖 Page 51 Generating a learning model



4. Displaying the difference extraction window

📖 Page 52 Difference Extraction Window



5. Extracting a difference

Set a video file to extract a difference and learning model.

Extract a difference.

📖 Page 56 Extracting a difference



6. Adjusting an extraction result

Set a difference extraction sensitivity.

Set a noise removal threshold.

📖 Page 58 Setting the difference extraction sensitivity

📖 Page 59 Setting a noise removal threshold



7. Saving the extraction result

Page 60 Saving the extraction result



8. Checking the extraction result (video file)

Page 29 Playing a Video File

MEMO

8 GENERATING A LEARNING MODEL

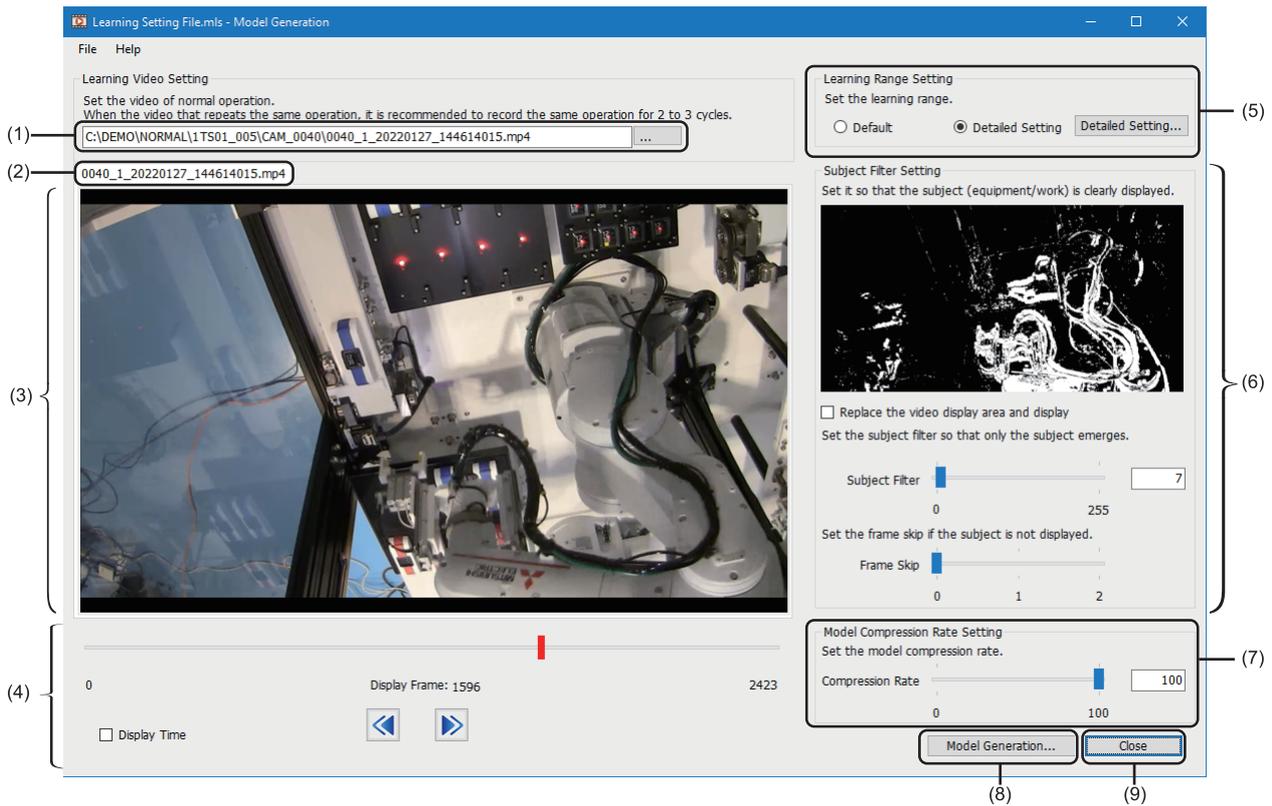
This chapter explains the operations to generate a learning model by using the model generation function.

8.1 Model Generation Window

This section explains the configuration of the "Model Generation" window.

Window

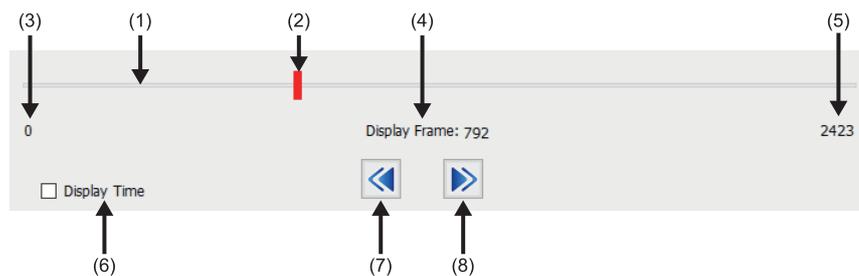
1. Start GX VideoViewer Pro. (☞ Page 17 Start)
2. Select [AI Analysis] ⇨ [Model Generation].



Displayed items

No.	Item	Description
(1)	Learning Video Setting	Set a video file to generate a video file. (☞ Page 46 Setting a video file)
(2)	Video file name	The video file name is displayed. When a camera comment is set to a video file included in a recording file, the camera comment is displayed. When no camera comment is set, an IP address is displayed.
(3)	Video display area	An image recorded at the time pointed by the slider is displayed. By moving the slider, the image is updated. The display magnification of the image is adjusted automatically according to the size of the main window. (An aspect ratio is not changed.)
(4)	Seek bar area	The seek bar is displayed. (☞ Page 42 Seek bar area)
(5)	Learning Range Setting	Set the learning range. (☞ Page 47 Setting the learning range) The "Detailed Setting" screen appears by selecting "Detailed Setting" or [Detailed Setting] button. (☞ Page 43 Detailed setting screen)
(6)	Subject Filter Setting	Set a subject filter. (☞ Page 49 Setting a subject filter/frame skip)
(7)	Model Compression Rate Setting	Set a compression rate of a learning model. (☞ Page 50 Setting a model compression rate)
(8)	[Model Generation] button	Click this to generate a learning model. (☞ Page 51 Generating a learning model)
(9)	[Close] button	Click this to save the learning parameters and open the "Difference Extraction" window.

Seek bar area



Displayed items

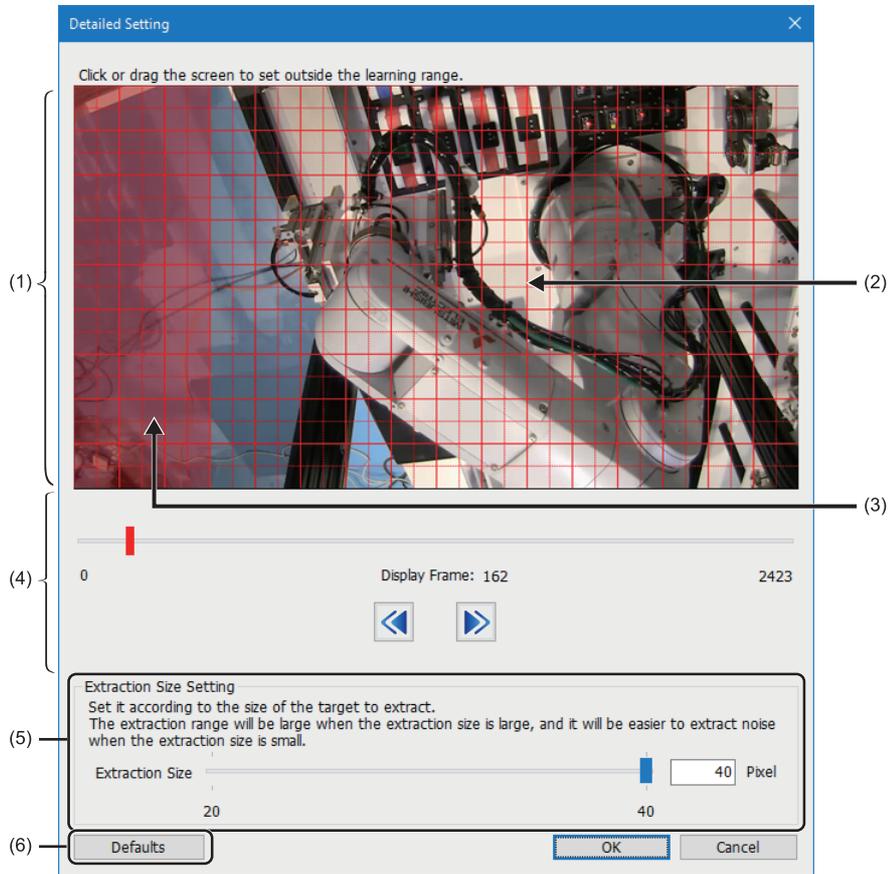
No.	Item	Description
(1)	Seek bar	The recording time range of the open video file is shown. By clicking the seek bar, the slider moves to the position clicked.
(2)	Slider	The position of an image being displayed in the video display area is shown. The slider is displayed in red on the seek bar. By dragging the slider to the left or right, the image is updated. The position of the sliders in the "Model Generation" window and "Detailed Setting" screen are automatically synchronized.
(3)	Video Start Frame/Time	The start frame number or start time of the video file is displayed.
(4)	Current Play Frame/Time	The frame number or time pointed by the slider is displayed.
(5)	Video End Frame/Time	The last frame number or the end time of the video file is displayed.
(6)	Display Time	Select this checkbox to display "Video Start Frame/Time," "Current Play Frame/Time," and "Video End Frame/Time" in time. By unselecting this checkbox, frame numbers are displayed.
(7)	◀ Previous Frame	Click this to play a video file backward by one frame.
(8)	▶ Next Frame	Click this to play a video file forward by one frame.

Detailed setting screen

The following explains the configuration of the "Detailed Setting" screen.

Window

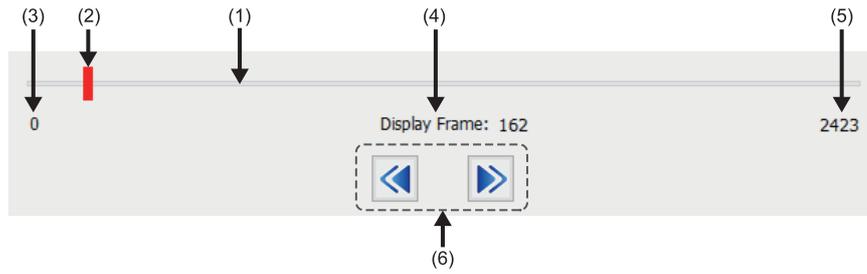
Select "Detailed Setting" in "Learning Range Setting" or click the [Detailed Setting] button.



Displayed items

No.	Item	Description
(1)	Video display area	An image recorded at the time pointed by the slider is displayed. By moving the slider, the image is updated. The display magnification of the image is adjusted automatically according to the size of the main window. (An aspect ratio is not changed.)
(2)	Patch grid	Red grids are displayed in the video display area according to the extraction size setting.
(3)	Out of the learning range	The part set as the out of the learning range is displayed in transparent red. (Page 47 Setting the learning range)
(4)	Seek bar area	The seek bar is displayed. (Page 44 Seek bar area)
(5)	Extraction Size Setting	Set the extraction size. (Page 47 Setting the learning range)
(6)	[Defaults] button	Click this to return the settings of the out of the learning range and extraction size to the defaults.

Seek bar area



Displayed items

No.	Item	Description	
(1)	Seek bar	The recording time range of the open video file is shown. By clicking the seek bar, the slider moves to the position clicked.	
(2)	Slider	The position of an image being displayed in the video display area is shown. The slider is displayed in red on the seek bar. By dragging the sliders to the left or right, the image is updated. The position of the sliders in the "Model Generation" window and "Detailed Setting" screen are automatically synchronized.	
(3)	Video Start Frame	The start frame number of the video file (0) is displayed.	
(4)	Current Frame	The frame number pointed by the slider is displayed.	
(5)	Video End Frame	The last frame number of the video file is displayed.	
(6)	Seeking operation	◀ Previous Frame	Click this to play a video file backward by one frame.
		▶ Next Frame	Click this to play a video file forward by one frame.

Menu configuration

The following table shows menus of the "Model Generation" window.

[File]	Reference
⇒ [New]	—
⇒ [Open]	Page 50 Saving learning parameters
⇒ [Save]	—
⇒ [Save As]	Page 50 Saving learning parameters

[Help]	Reference
⇒ [Open Manual]	Page 19 Opening Manual

8.2 Generating a Learning Model

This section explains the method for setting learning parameters and generating a learning model.

A learning model can be generated by a video file generated by using a camera recorder module (*.mp4, *.mov).

A learning model cannot be generated from the following video files:

- A video file generated by using Camera Recording Package (*.mkv)
- A video file generated by using the difference extraction function (*.wmv)

Setting learning parameters

The following explains the method for setting the following learning parameters required for generating a learning model.

- Setting a video file (☞ Page 46 Setting a video file)
- Setting the learning range (☞ Page 47 Setting the learning range)
- Setting a subject filter (☞ Page 49 Setting a subject filter/frame skip)
- Setting a model compression rate (☞ Page 50 Setting a model compression rate)

Point

Learning parameters can be utilized from a learning setting file. (☞ Page 50 Saving learning parameters)

Setting a video file

A video file to generate a learning model can be set.

Operating procedure

Specify a video file in which an image of the normal operation is recorded by any of the following operations:

- Enter the path to the target video file in the text box.
- Click the [...] button and select a video file in the "Open" screen.
- Drag and drop a video file onto the "Model Generation" window.



Point

- Set a video file in which an image of the normal operation is recorded.
- When the "Model Generation" window is opened while a video file is displayed in the main window of GX VideoViewer Pro, the displayed video file is set automatically.
When opening multiple video files, a selected video file is set.
- A recording file (*.melrc) also can be specified. When setting a recording file (*.melrc), the "Select Video" screen appears, and a video file to be opened can be selected.
If a camera comment is set to the video file, the camera comment is displayed in the "Video Select" screen.
If no camera comment is set, an IP address is displayed.

Setting the learning range

The learning range (extraction size and out of the learning range) can be set.

When "Default" is selected in "Learning Range Setting" in the "Model Generation" window, a learning model is generated with the extraction size set to '25.'

When selecting "Detailed Setting," the learning range can be set in the "Detailed Setting" screen.

For the screen configuration of the "Detailed Setting" screen, refer to the following:

☞ Page 43 Detailed setting screen

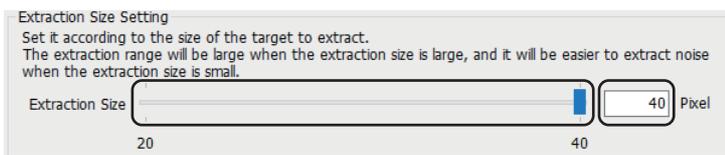
■ Setting an extraction size

The spacing of patch grids can be changed according to a part where a difference is to be extracted.

The extraction size is a unit to divide an image horizontally and vertically when generating a learning model.

A feature is extracted by dividing an image (1 frame) at the specified extraction size.

Operating procedure



Perform either of the following operations:

- Enter a value in the text box.
- Move the slider of "Extraction Size."

The spacing of the patch grids in the video display area is changed.

Point

It is recommended to generate a learning model at the default extraction size '25.'

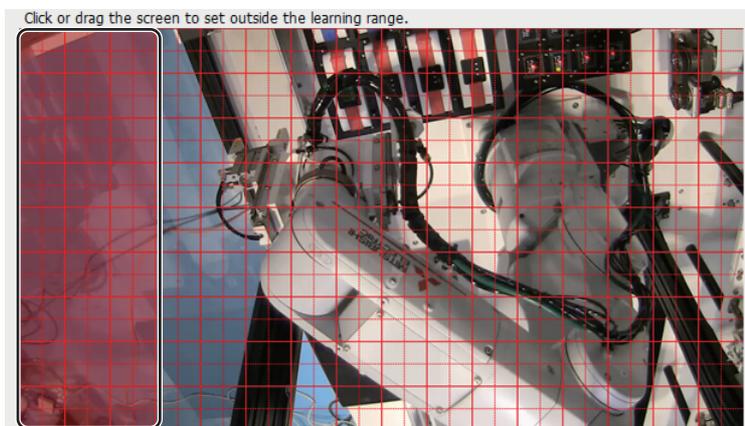
When the smaller extraction size is set, a finer difference can be extracted.

However, noises are likely extracted as a difference.

■ Setting the out of the learning range

The part where a difference is not to be extracted can be set as the out of the learning range for the image divided with patch grids.

Operating procedure



Perform either of the following operations for a part where a difference is not to be extracted:

- Click a patch grid.
- Click a patch grid, then drag the mouse.

The selected part is displayed in transparent red as the out of the learning range.

Point

- It is recommended to set a part where the difference of operation is large (a person is reflected, for example) as the out of the learning range even in the image of the normal operation. Moreover, the part with the variation of operation or appearance is recommended to set as the out of the learning range even in the image of the normal operation.
- By setting the out of the learning range, the time required to generate a learning model can be shorten.

Precautions

- A difference may be extracted in the adjacent part even when setting the out of the learning range.
- The patch grids of the corners of the video display area are selected together with the one inner patch grids.
- Some parts are treated as they are out of the learning range in the following case regardless of the setting: the part is surrounded by the out of the learning range, and the patch grids range for 4 squares (2×2) is not ensured.

Setting a subject filter/frame skip

A subject filter and frame skip can be set.

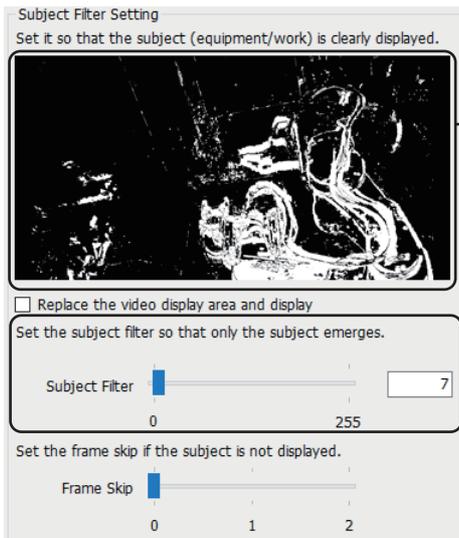
■ Setting a subject filter

A subject filter can be set to prevent an extra noise (vibration, etc.) other than the operation of a subject from being extracted as a difference.

A subject is a moving object in an image.

A subject filter is a threshold to judge a part where a difference of the value is greater than the subject filter as a difference by comparing a value of a frame and previous frame (gray scale).

Operating procedure



1. Display an image of the frame where a subject to extract a difference operates in the video display area in the "Model Generation" window. (☞ Page 41 Model Generation Window)

An image of the same frame as the video display area is displayed in the subject display area(1).

2. Perform either of the following operations:

- Enter a value in the text box of "Subject Filter."
- Move the slider of "Subject Filter."

The part judged as a difference is displayed in white in an image in the subject display area.

Point

- Set a subject filter so that only a subject to extract a difference is emerged clearly.
- By selecting the checkbox of "Replace the video display area and display," an image in the subject display area can be displayed in the video display area.

Precautions

When the slider in the seek bar area is on the position where no image exists 1 to 3 frames before, no image is displayed in the subject display area.

■ Setting a frame skip

The higher value for "Frame Skip" can be set when a subject in the subject display area is not displayed clearly due to the following reasons:

- The change of the operation between frames is small.
- The operation for the frame rate is small.

Operating procedure

Move the slider of "Frame Skip."

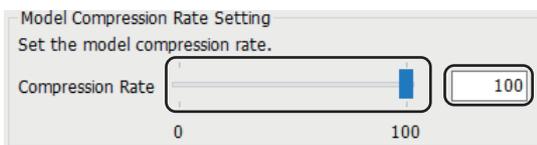
Point

- For a video file, such as an image hardly changes only by playing a video file forward or backward by one frame, "Frame Skip" is recommended to be set to higher.
Moreover, when a part of a frame is dropped, set the higher value for "Frame Skip."
- By setting the higher value for "Frame Skip", the change of the operation between frames becomes large, and a difference can be found more easily. In addition, a difference can be extracted more easily.
- For generating a learning model and extracting a difference, 60 frames or more are required.
Therefore, when a video file to extract a difference may be less than 180 frames, it is recommended to specify '0' for the value of "Frame Skip."

Setting a model compression rate

A compression rate of a learning model can be set.

Operating procedure



Perform either of the following operations:

- Enter a value in the text box.
- Move the slider of "Compression Rate."

Point

It is recommended to generate a learning model at the default compression rate '100.'
To extract a difference of finer operation, lower the compression rate.

However, when lowering the compression rate, it takes longer time to generate a learning model and extract a difference.

Saving learning parameters

Learning parameters can be saved.

Operating procedure

Select [File] ⇒ [Save As].

A learning setting file (*.mls) is output.

Point

The set learning parameters can be utilized by selecting the following menu and opening a learning setting file:

- [File] ⇒ [Open]

Generating a learning model

The following explains the method for generating a learning model.

Operating procedure

1. Click the [Model Generation] button in the "Model Generation" window.

The "Save As" screen appears.

2. Set a file name, and click the [Save] button.

A learning model file (*.model) is generated.

Point

By clicking the [Close] button, the "Difference Extraction" window is opened while the generated learning model is set.

Precautions

- Normally, a cache (temporary file) generated in the save destination of a learning model file is deleted automatically. However, the cache may remain when GX VideoViewer Pro is forcibly terminated. In this case, delete the "cache" folder manually.
- The learning parameters of a learning model generated once cannot be added or changed. To generate a learning model in the different learning parameters, create a new learning model.

9 EXTRACTING A DIFFERENCE

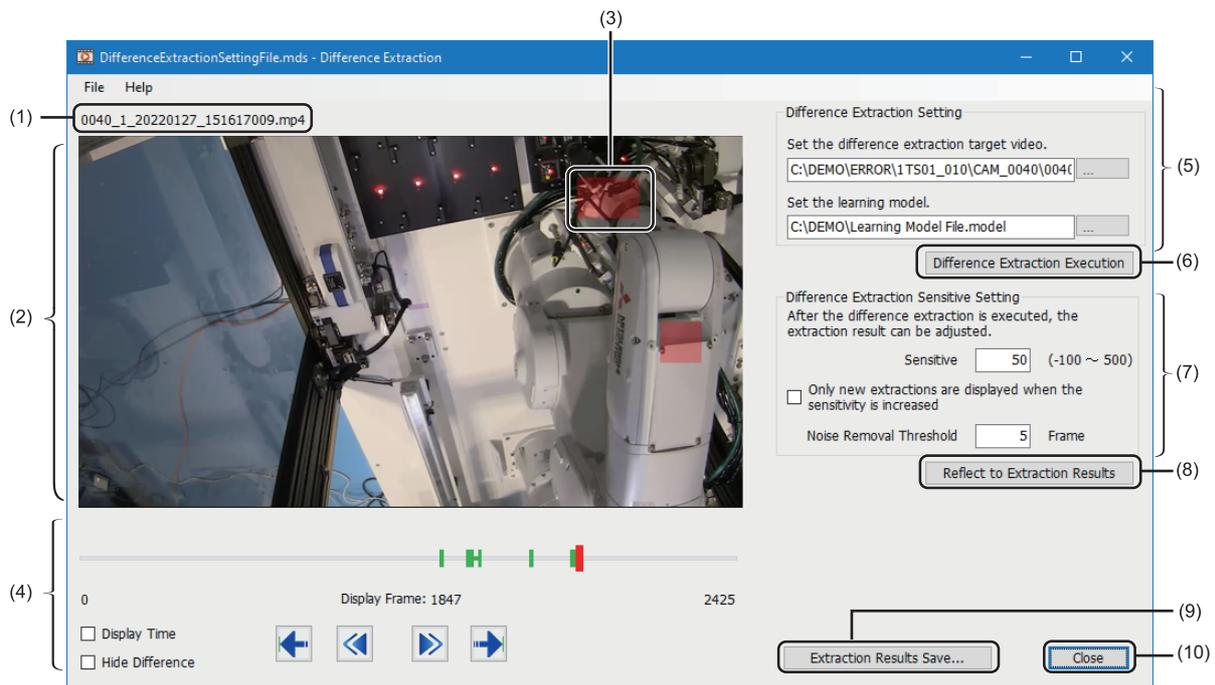
This chapter explains the operations to extract a difference between a video file at error occurrence and a learning model by using the difference extraction function.

9.1 Difference Extraction Window

This section explains the configuration of the "Difference Extraction" window.

Window

1. Start GX VideoViewer Pro. (☞ Page 17 Start)
2. Select [AI Analysis] ⇨ [Difference Extraction].

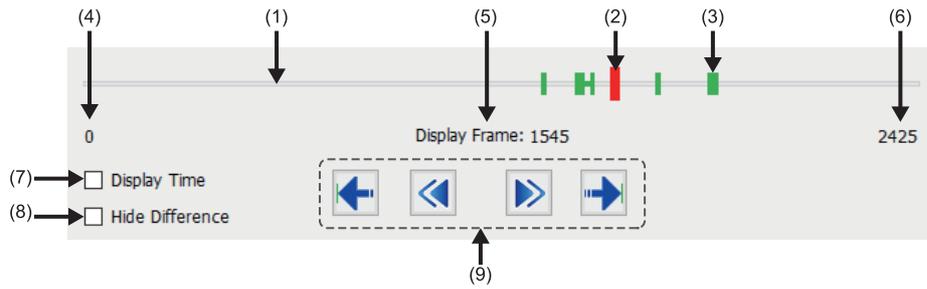


Displayed items

No.	Item	Description
(1)	Video file name	The video file name is displayed. When a camera comment is set to a video file included in a recording file, the camera comment is displayed. When no camera comment is set, an IP address is displayed.
(2)	Video display area	An image recorded at the time pointed by the slider is displayed. By moving the slider, the image is updated. The display magnification of the image is adjusted automatically according to the size of the main window. (An aspect ratio is not changed.)
(3)	Difference extraction part	After a difference is extracted, the extracted difference is displayed in transparent red.
(4)	Seek bar area	The seek bar is displayed. (☞ Page 54 Seek bar area)
(5)	Difference Extraction Setting	Set a video file to extract a difference and a learning model. (☞ Page 56 Extracting a difference)
(6)	[Difference Extraction Execution] button	Click this to extract a difference. (☞ Page 56 Extracting a difference)
(7)	Difference Extraction Sensitive Setting	Set the difference extraction sensitivity and noise removal threshold. (☞ Page 58 Adjusting the extraction result)
(8)	[Reflect to Extraction Results] button	Click this to reflect the setting contents of 'Difference Extraction Sensitive Setting.' Information of the video display area and difference markers are updated.

No.	Item	Description
(9)	[Extraction Results Save] button	Click this to save a video file to which the difference extraction result is reflected, a file in which time information is recorded, and log marker information file. (☞ Page 60 Saving the extraction result)
(10)	[Close] button	Click this to close the "Difference Extraction" window. When the difference extraction is completed, an image of a video file to which the difference extraction result is reflected can be displayed in the main window of GX VideoViewer Pro.

Seek bar area



Displayed items

No.	Item	Description												
(1)	Seek bar	The recording time range of the open video file is shown. By clicking the seek bar, the slider moves to the position clicked.												
(2)	Slider	The position of an image being displayed in the video display area is shown. The slider is displayed in red on the seek bar. By dragging the slider to the left or right, the image is updated.												
(3)	Difference marker	An extracted difference is displayed in green.												
(4)	Video Start Frame/Time	The start frame number or start time of the video file is displayed.												
(5)	Current Play Frame/Time	The frame number or time pointed by the slider is displayed.												
(6)	Video End Frame/Time	The last frame number or the end time of the video file is displayed.												
(7)	Display Time	Select this checkbox to display "Video Start Frame/Time," "Current Play Frame/Time," and "Video End Frame/Time" in time. By unselecting this checkbox, frame numbers are displayed.												
(8)	Hide Difference	Select this checkbox to hide a difference extraction part.												
(9)	Seeking operation	<table border="1"> <tr> <td>◀</td> <td>Previous Difference Marker</td> <td>Click this to move the slider to a previous difference marker.</td> </tr> <tr> <td>◀◀</td> <td>Previous Frame</td> <td>Click this to play a video file backward by one frame.</td> </tr> <tr> <td>▶▶</td> <td>Next Frame</td> <td>Click this to play a video file forward by one frame.</td> </tr> <tr> <td>▶</td> <td>Next Difference Marker</td> <td>Click this to move the slider to a next difference marker.</td> </tr> </table>	◀	Previous Difference Marker	Click this to move the slider to a previous difference marker.	◀◀	Previous Frame	Click this to play a video file backward by one frame.	▶▶	Next Frame	Click this to play a video file forward by one frame.	▶	Next Difference Marker	Click this to move the slider to a next difference marker.
◀	Previous Difference Marker	Click this to move the slider to a previous difference marker.												
◀◀	Previous Frame	Click this to play a video file backward by one frame.												
▶▶	Next Frame	Click this to play a video file forward by one frame.												
▶	Next Difference Marker	Click this to move the slider to a next difference marker.												

Menu configuration

The following table shows menus of the "Difference Extraction" window.

[File]	Reference
⇒ [New]	—
⇒ [Open]	Page 60 Saving the extraction settings
⇒ [Save]	—
⇒ [Save As]	Page 60 Saving the extraction settings
[Help]	Reference
⇒ [Open Manual]	Page 19 Opening Manual

9.2 Extracting a Difference

This section explains the method for extracting a difference and adjusting/saving the extraction result.

A difference can be extracted from a video file generated by using a camera recorder module (*.mp4, *.mov).

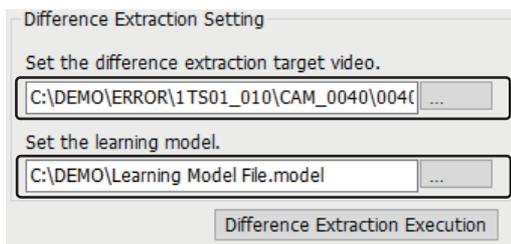
A difference cannot be extracted from the following video files:

- A video file generated by using Camera Recording Package (*.mkv)
- A video file generated by using the difference extraction function (*.wmv)

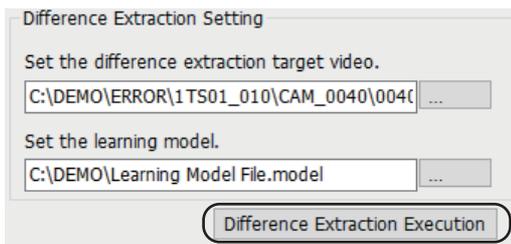
Extracting a difference

The following explains the method for extracting a difference.

Operating procedure



1. Set a video file to extract a difference and learning model by any of the following operations:
 - Enter the path to a video file and learning model in the text box.
 - Click the [...] button and select a video file and learning model in the "Open" screen.
 - Drag and drop a video file and learning model onto the "Difference Extraction" window.



2. Click the [Difference Extraction Execution] button.



When the difference extraction is completed, a difference extraction part in the video display area and a difference marker is updated.

- After generating a learning model, the "Difference Extraction" window can be opened. In this case, the generated learning model is set automatically.
- When the "Difference Extraction" window is opened while a video file is displayed in the main window of GX VideoViewer Pro, the displayed video file is set automatically. When multiple video files are displayed, a selected video file is set.
- A recording file (*.melrc) also can be specified. When setting a recording file (*.melrc), the "Select Video" screen appears, and a video file to be opened can be selected. If a camera comment is set to the video file, the camera comment is displayed in the "Video Select" screen. If no camera comment is set, an IP address is displayed.
- The extraction settings can be utilized from a difference extraction setting file. ( Page 60 Saving the extraction settings)
- A difference extraction part in the video display area is hidden by selecting the checkbox of "Hide Difference" in the seek bar area.
- An image of a video file to which the difference extraction result is reflected can be displayed in the main window of GX VideoViewer Pro by clicking the [Close] button after saving a video file from which a difference is extracted.

Precautions

If a new video file is set to extract a difference after extracting it once, the previous difference extraction result is discarded. Therefore, a difference extraction part in the video display area and difference marker is reset.

Adjusting the extraction result

The following explains the method for adjusting the extraction result.

After extracting a difference, the extraction result can be adjusted to change the fineness of a difference or when a lot of noises are extracted.

Point

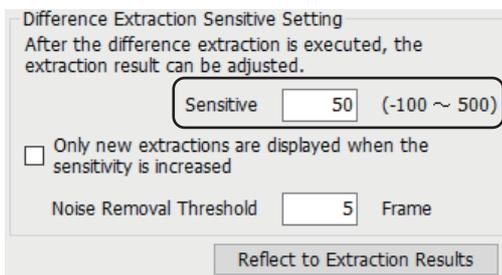
The difference extraction sensitivity and noise removal threshold can be set before extracting a difference.

Setting the difference extraction sensitivity

The fineness of a difference to be extracted can be changed.

By setting the higher difference extraction sensitivity, a difference of fine operation is extracted, and by setting the lower difference extraction sensitivity, only a difference of rough operation is extracted.

Operating procedure



1. Enter a value in the text box of "Sensitive"
2. Click the [Reflect to Extraction Results] button.

A difference extraction part in the video display area and a difference marker is updated.

Point

When setting the higher difference extraction sensitivity and extracting a difference again, only the newly extracted difference can be displayed by selecting the checkbox of "Only new extractions are displayed when the sensitivity is increased."

Setting a noise removal threshold

Only the part where an error occurs consecutively can be refined.

A noise removal threshold is used to refine only the part where an error occurs consecutively in the extraction result.

For example, among the extracted parts, to regard only the part where 10 or more consecutive frames are extracted as different, set '10.'

Operating procedure

Difference Extraction Sensitive Setting
After the difference extraction is executed, the extraction result can be adjusted.

Sensitive (-100 ~ 500)

Only new extractions are displayed when the sensitivity is increased

Noise Removal Threshold Frame

Reflect to Extraction Results

1. Enter a value in the text box of "Noise Removal Threshold."

2. Click the [Reflect to Extraction Results] button.

A difference extraction part in the video display area and a difference marker is updated.

Saving the extraction result

The following explains the method for saving the extraction result and extraction settings.

Saving a video file from which a difference is extracted

An extraction result can be saved in a video file.

An image of a video file to which the difference extraction result is reflected can be displayed in the main window of GX VideoViewer Pro.

Operating procedure

Click the [Extraction Results Save] button in the "Difference Extraction" window.

The following files are generated:

- Difference extracted video file (*.wmv)
- File in which time information is recorded (*.xml)
- Log marker information file *1 (*.vms)

*1 Start/end points of difference markers are saved up to 100 points.

Saving the extraction settings

The following extraction settings are saved in a file:

- Path to a video file to extract a difference
- Path to a learning model
- Difference extraction sensitivity
- Noise removal threshold

Operating procedure

Select [File] ⇒ [Save As].

A difference extraction setting file (*.mds) is output.

Point

The saved extraction settings can be utilized by selecting the following menu and opening a difference extraction setting file:

- [File] ⇒ [Open]
-

APPENDIX

Appendix 1 Additions and Changes from Previous Version

This section shows the additions and changes with upgrade.
For GX VideoViewer Pro, version 1.024A is the first edition.

Version 1.006G

Item	Description	Reference
Product name	The product name is changed from Video Verification Tool to GX VideoViewer.	—
Interaction with GX Works3	GX VideoViewer can be started from GX Works3.	Page 17 Start
Playing a video file	The speed to play a video file can be changed.	Page 25 Seek bar area
	A video can seek backward or forward one or 10 seconds.	
	Up to four video files can be played at once synchronizing their time.	Page 31 Playing a video file
Log marker	The following operations can be performed in the "Edit Comment/Color" screen: <ul style="list-style-type: none">• Adding a comment for a log marker.• Changing the color of a log marker.	Page 27 Edit comment/color screen
	Log markers in a recording file/data logging file that is opened in GX Works3 can be applied to a video file that is opened in GX VideoViewer.	Page 34 GX VideoViewer/Pro

Version 1.009K

Item	Description	Reference
Playing a video file	A video file generated by using a camera recorder module (RD81RC96-CA) can be played.	Page 29 Video file generated by using a camera recorder module Page 29 Video file generated by using Camera Recording Package Page 32 Opening a video file

Version 1.015R

Item	Description	Reference
Start of GX VideoViewer	The display position and window size of GX VideoViewer at startup can be specified by specifying an option in a command line.	Page 17 Starting GX VideoViewer/Pro by specifying the display position and window size
Playing a video file	The slider can be moved to a trigger position marker by using the [Previous Marker] button/[Next Marker] button.	Page 25 Seek bar area
	The following video files are supported: <ul style="list-style-type: none">• Image resolution (pixels): 1280 × 960• Frame rate (fps): 180	Page 29 Video file generated by using a camera recorder module
Log marker	Log markers in a recording file/data logging file that is opened in GX LogViewer can be applied to a video file that is opened in GX VideoViewer.	Page 34 GX VideoViewer/Pro

Version 1.024A

Common: GX VideoViewer and GX VideoViewer Pro

Item	Model	Description	Reference
Supported operating system	Common	Windows 11 is supported.	—
Playing a video file	Common	A video file generated by using the difference extraction function of GX VideoViewer Pro can be played.	Page 29 Video file generated by using the difference extraction function of GX VideoViewer Pro
		When playing a video file included in a recording file (*.melrc), other video files can be played even if part of the video files fails to be acquired.	—
AI analysis function	Pro	A learning model can be generated from the video file of the normal operation, and a difference can be extracted by comparing the learning model and a video file at error occurrence.	Page 13 Analyzing a video file with AI (model generation/difference extraction) Page 38 FLOW OF AI ANALYSIS Page 41 GENERATING A LEARNING MODEL Page 52 EXTRACTING A DIFFERENCE

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Appendix 2 TROUBLESHOOTING

This chapter explains the errors which may occur when using GX VideoViewer/Pro, and corrective actions correspond to those errors.

For common functions

Symptom	Check point	Corrective action
GX VideoViewer/Pro cannot be installed.	Is the operating system other than the following used? • Windows 10 (64-bit version) • Windows 11	Use an operating system of Windows 10 (64-bit version) or Windows 11.
An error message appears when starting GX VideoViewer/Pro.	—	Start GX VideoViewer/Pro as an administrator.
Contents in the screen are not displayed properly. (For example, overlapping of icons, text overflowing from the frame of a button, etc.)	Is the size of the text and other items in the screen set to a value other than 100% (96 DPI, 9 pt etc.) in Windows settings?	<ul style="list-style-type: none"> • Set the value to 100% (96 DPI, 9 pt etc.). • For Windows 10 (version 1703 or later)^{*1} or later, the display of GX VideoViewer/Pro can be displayed with high DPI scaling by using a function of the operating system.^{*2} <ol style="list-style-type: none"> 1 Select and right-click 'GVViewer.exe'^{*3}, and select [Properties] from the shortcut menu. 2 Click the [Change high DPI settings] button in the [Compatibility] tab. 3 Select the checkbox of "Override high DPI scaling behavior. Scaling performed by:," then select "System" from the pull-down list. 4 Click the [OK] button.
A video file cannot be opened.	Is the video file generated by using FBs included in Camera Recording Package?	Use a video file generated by using FBs included in Camera Recording Package.
	Is the configuration of a folder in which the video file is stored changed?	Open the video file without changing the folder configuration when the video file was generated.
	Is the data of the video file edited? Is the name of the video file changed?	Open the video file without changing the data and file name when the video file was generated.
The following error message appears and a video file cannot be opened. • VideoReaderEngine64.exe has stopped the operation.	Is a decoder manufactured by a third party installed?	Uninstall the decoder manufactured by a third party.
The operation of GX VideoViewer/Pro becomes slow and a frame is dropped while playing/seeking a video file.	Is any of the following conditions satisfied? • The resolution of the video file is FHD (1920 × 1080) or higher. • The frame rate (fps) of the video file is 120 or higher. • Multiple video files are played at the same time.	<p>Lower the speed to play the video file.</p> <p>To play the video file smoothly, it is recommended to play the video file on a personal computer with the following specifications.</p> <ul style="list-style-type: none"> • CPU: 6th Intel® Core™ i7 or higher • GPU: Intel HD Graphics 530 or more • Required memory: 8 GB or more • Storage: SSD
A gray frame appears while playing/seeking a video file.	Is the video file recorded at a set frame rate?	Refer to 'Troubleshooting on playing a video file' in the following: IMELSEC iQ-R System Recorder User's Manual (Application)

*1 The Windows version can be checked by the following procedure.

- 1 Enter "winver" in the search box of Windows, and select it from the menu.
- 2 Check the version in the displayed screen.

*2 The display of GX VideoViewer/Pro will be blurred by enlarging.

The following lists the setting value for "Change the size of text, apps, and other items" and the recommended display resolution for each setting value in Windows 10 or later.

Setting value: 100%, display resolution: 1024 × 768 dots or more

Setting value: 125%, display resolution: 1900 × 1200 dots or more

Setting value: 150%, display resolution: 1900 × 1200 dots or more

Setting value: 175%, display resolution: 2880 × 1620 dots or more

Setting value: 200%, display resolution: 2880 × 1620 dots or more

Setting value: 225%, display resolution: 3840 × 2160 dots or more

Setting value: 250%, display resolution: 3840 × 2160 dots or more

*3 'GVViewer.exe' is stored in the folder where GX VideoViewer/Pro is installed.

The following is an example of a storage location.

C:\Program Files\MELSOFT\REPROA\GVViewer.exe

For Pro dedicated function

Symptom	Check point	Corrective action
An error occurs during the model generation, and the generation fails.	Is the free space of the local disk specified as a save destination of a learning model less than 200 GB?	Specify a folder on the local drive with 200 GB or more free space as a save destination of a learning model.
It takes time to generate a learning model and the processing is not completed.	Is an HDD specified as a save destination of a learning model?	Specify a folder on the local drive of an SSD as a save destination of a learning model.
	Is a learning model generated from a video file whose total number of frames is large (10,000 frames or more)?	<ul style="list-style-type: none"> • Add the out of the learning range in "Learning Range Setting." • Set a higher value for "Frame Skip." • Set a higher value for "Compression Rate."
An error occurs during the difference extraction, and the extraction fails.	Is the free space of the local disk in which a learning model is stored less than 200 GB?	<ol style="list-style-type: none"> 1 Close the "Difference Extraction" window. 2 Move a learning model to the local drive with 200 GB or more free space. 3 Open the "Difference Extraction" window, and open the moved learning model. 4 Extract a difference again.
It takes time to extract a difference, and the processing is not completed.	Is a learning model saved in a folder on an HDD?	<ol style="list-style-type: none"> 1 Close the "Difference Extraction" window. 2 Move a learning model to a local drive on an SSD. 3 Open the "Difference Extraction" window, and open the moved learning model. 4 Extract a difference again.
There are a lot of difference extraction parts, and an error location cannot be refined.	Are there too many difference extraction parts?	<ul style="list-style-type: none"> • Set a higher value for "Noise Removal Threshold" and click the [Reflect to Extraction Results] button, then check the updated extraction result. • After setting the higher value for "Sensitive" in "Difference Extraction Setting," click the [Reflect to Extraction Results] button. <p>If an error location cannot be found even in the updated extraction result, perform the following operations:</p> <ol style="list-style-type: none"> 1 Select the checkbox of "After the difference extraction is executed, the extraction result can be adjusted." 2 After setting the higher value for "Sensitive," click the [Reflect to Extraction Results] button. 3 Check the newly extracted part in the updated extraction result. <ul style="list-style-type: none"> • Set a part where a difference is extracted even though it is a normal operation, to the out of the learning range in "Learning Range Setting" in the "Model Generation" window, then generate a learning model again.
After extracting a difference, an error location is not displayed.	<p>■When none of difference extraction parts are displayed</p> <ul style="list-style-type: none"> • Is "Sensitive" in "Difference Extraction Sensitive Setting" low? • Is "Compression Rate" in the "Model Generation" window high? 	<ul style="list-style-type: none"> • Click the [Reflect to Extraction Results] button after setting a higher value for "Sensitive" in "Difference Extraction Sensitive Setting," then check the updated extraction result. • Set a lower value for "Compression Rate" in the "Model Generation" window, then generate a learning model again.
	<p>■When there is a frame where no difference extraction part is displayed</p> <p>Is a part of frame in an image dropped?</p>	Set a higher value for "Frame Skip" in "Subject Filter Setting" in the "Model Generation" window, then generate a learning model again.
The "Model Generation" window or "Difference Extraction" window is not opened.	<p>Is a message indicating the following contents is displayed even though the window is closed?</p> <ul style="list-style-type: none"> • The "Model Generation" window cannot be opened because the "Difference extraction" window is opened. • The "Difference extraction" window cannot be opened because the "Model Generation" window is opened. 	<ol style="list-style-type: none"> 1 Start the task manager of Windows. 2 Terminate 'GVTrain.exe' or 'GVTest.exe.' 3 Open the "Model Generation" window or "Difference Extraction" window.
When closing the "Difference Extraction" window, a difference extracted video file cannot be opened.	Is a space included in the full path of the difference extracted video file?	<p>Select the following menu of the main window of GX VideoViewer Pro, and open the difference extracted video file.</p> <ul style="list-style-type: none"> • [File] ⇒ [Open]
The "Model Generation" window or "Difference Extraction" window is closed during operation.	Is the value other than '0' set for "Frame Skip" when the frame of a video file is 180 or lower.	When the frame of the video file is 180 or lower, set '0' for "Frame Skip" and generate a learning model.

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The jzlib library, itself, is a re-implementation of ZLIB v1.1.3 in pure Java.

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October 2020	SH(NA)-082370ENG-A	First edition
January 2021	SH(NA)-082370ENG-B	■Added or modified parts Chapter 1, Section 1.1, Section 3.3, Section 5.1, Section 5.3, Section 6.1, Chapter 8, Appendix 1
July 2021	SH(NA)-082370ENG-C	■Added or modified parts Section 3.3, Section 5.1, Section 6.1, Section 6.2, Chapter 8, Appendix 1
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