PVWIN-T30 / PV-T30 instructions manual
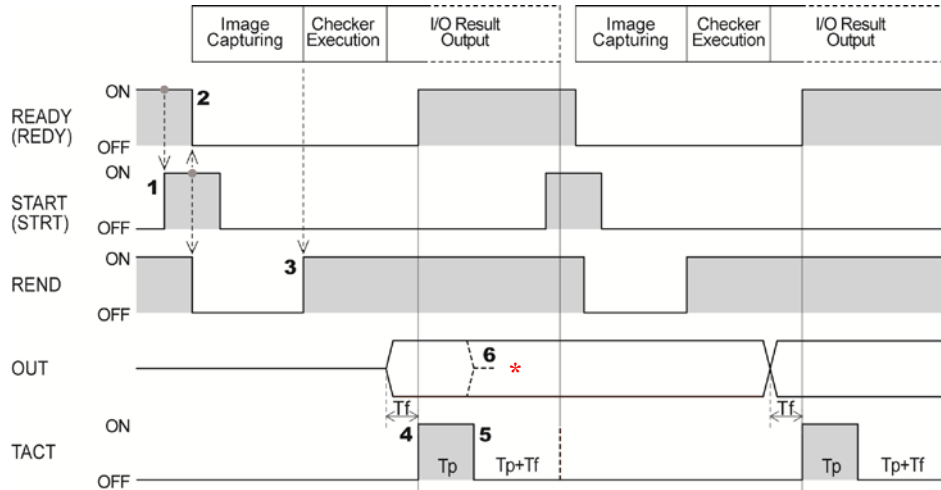## ＜Support documentation＞

Nov. 24, 2015

1.1 Timing Chart

Typical Operations in Inspections

Common Trigger

In serial processing mode

Tf: 400μs (fixed), Tp (1-1000ms): Data output guarantee time (default: 10 ms)

* Out signal turns off this timing when setting "Parallel I/O Output Reset Condition" to "Reset".

1. **Make sure that REDY signal is ON and then turn on STRT signal for more than 1 ms.**

2. **PV-T30 turns off REDY signal and REND signal, and starts capturing an image.**

   The OFF time of REDY signal is called "inspection time" up to No.4.

   ▶ Note

   The delay time mentioned on the right may occur from the input of STRT signal until the start of image capture (REND signal is OFF) when displaying a live image.

   0.3-Mega Compact Camera:Max. 12 msec + Shutter speed

3. **After image capturing is completed, PV turns on REND signal and executes checkers.**

4. **As the inspection ends, a result is output through I/O interface and TACT signal and REDY signal are turned on after the period of "Tf".**

   When executing synchronous output (data output to COM port and Ethernet port or image output) as well as I/O output, REDY signal stays OFF until these outputs complete.

   After REDY signal turns ON, the device can receive the next STRT signal.

   Obtain a result after more than 1 ms of wait time when TACT signal turns on.

   ▶ Note

   The time from when TACT signal turns on till when the result output (OUT signal) is determined varies according to the condition of the connected load or ambient temperature.

5. **TACT signal is turned on for the time of "Tp", and then turned off for the time of "Tp + Tf".**

   While the signal is off, result of the next inspection is not output.

6. **Out signal keeps on status until the next output (Hold), or turns off when TACT signal turns off (Reset).**

   Follow the procedure described below to select "Hold" or "Reset".

   PV-T30："Environment setting" from the select menu > [System Settings] > [Operation] > "Parallel I/O Output Reset Condition"

   PV-WINT30：[Environment] from the Navigation View → [System Settings] → [Operation-Inspection setting] →"Parallel I/O Output Reset Condition"

In parallel processing mode
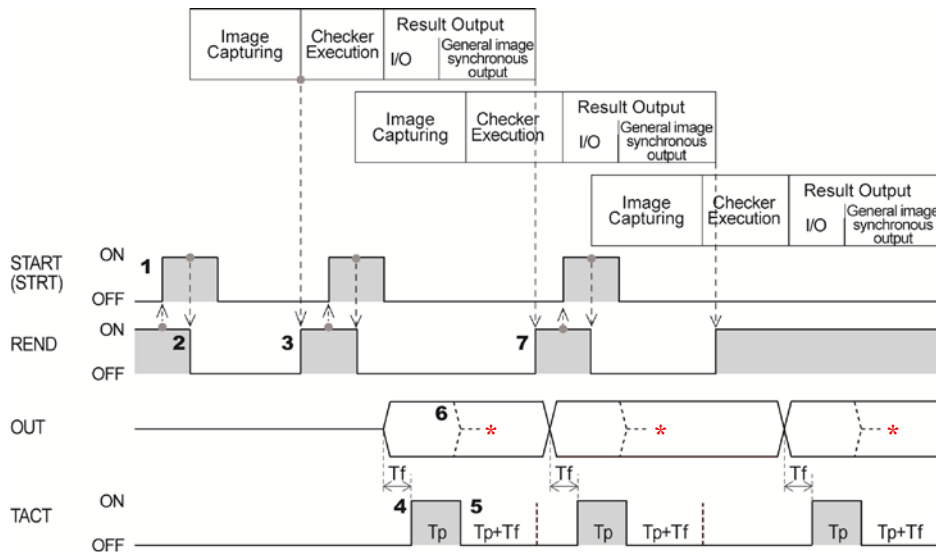
Tf: 400μs (fixed), Tp (1-1000ms): Data output guarantee time (default: 10 ms)

* Out signal turns off this timing when setting "Parallel I/O Output Reset Condition" to "Reset".

1. **Make sure that REND signal is ON and then turn on STRT signal for more than 1 ms.**

2. **PV-T30 turns off REND signal and starts capturing an image.**

   ▶ Note

   The delay time occurs from the input of STRT signal until the start of image capture (REND signal is OFF) when displaying a live image.
   Make the settings for Capture Delay from the following items.
   PV-T30 : "main menu" from the select menu > [Camera] > [Capture Delay]
   PVWIN-T30 : [Camera] from the Navigation View > [Capture Delay]   (Settable range: 0.0 to 999.9 ms)

3. **After image capturing is completed, PV turns on REND signal and executes checkers.**

   After REND signal turns on, PV-T30 can receive STRT signal (or capture and image).
   At the timing when it starts capturing the next image, input STRT signal.

4. **As the inspection ends, a result is output through I/O interface and TACT signal is turned on after the period of "Tf".**

   Obtain a result after more than 1 ms of wait time when TACT signal turns on.

   ▶ Note

   The time from when TACT signal turns on till when the result output (OUT signal) is determined varies according to the condition of the connected load or ambient temperature.

5. **TACT signal turns on for the time of "Tp", and then turns off for the time of "Tp + Tf".**

   You cannot output the next result while the signal is off and the device is in the status of waiting for output.

6. **OUT signal keeps on status till the next output (Hold), or turns off when TACT signal turns off (Reset).**

   Make the settings for "Hold" or "Reset" from the following items.
   PV-T30 : "Environment setting" from the select menu > [System Settings] > [Operation] >
   PV-WINT30 : [Environment] from the Navigation View → [System Settings] → [Operation-Inspection setting] →"Parallel I/O Output Reset Condition"

7. **After the second image capturing is completed, PV executes checkers. If the first data has been output at the time, REND signal is turned on. If it has not, PV waits until the data is output and turns on REND signal.**

   After REND signal turns on, PV-T30 can receive STRT signal (or capture and image).At the timing when it starts capturing the next image, input STRT signal.

▶ Note

Setting "Image Output" to "Async.(inspection first)" turns on REND signal and allows capturing the third image after the second image capturing or the first synchronous result output (general output through I/O and synchronously) whichever completed later, before outputting the general result and the image of the first inspection is completed.

Outputting All Results (Output = All)

When the Handshake Function Is Set to "No"

Inspection data are output at intervals of set "Output signal guarantee time (Tp)". STRB signal turns on each time outputting the data.Receive data with the external device after rising edge of STRB ON signal and before the next STRB signal turns on.

The following is an example of outputting data dividing into two times in Serial mode.
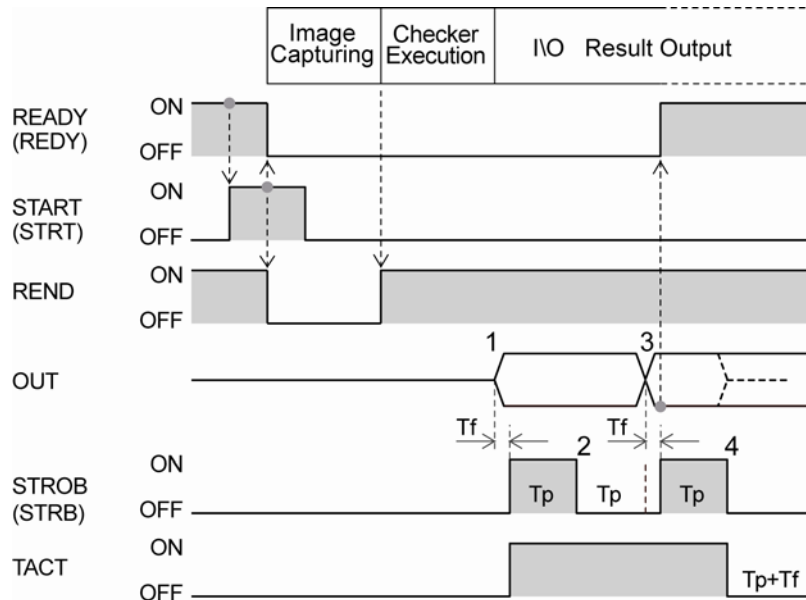
Tf: 400μs (fixed), Tp (1-1000ms): Data output guarantee time (default: 10 ms)

1. **As the inspection ends, the first data (OUT signal) is output through I/O interface and turned on STRB signal and TACT signal.**

   Obtain the first result after more than 1 ms of wait time when STRB signal turns on.
   ▶ Note
   The time from when STRB signal turns on till when the result output (OUT signal) is determined varies according to the condition of the connected load or ambient temperature.

2. **STRB signal turns off after the time of Tp passes.**

3. **As the time of Tp passed from STRB signal turns off, the second data is output and STRB signal and REDY signal turn on(*).**

   Obtain the second result after more than 2 ms of wait time when STRB signal turns on.
   ▶ Note
   When synchronous output is operated in addition to I/O output, including data output to COM port and Ethernet port, and inspection image output, READY signal stays OFF until the operation is completed.

4. **STRB signal and TACT signal turn off after the time of Tp passes. Setting "Parallel I/O Output Reset Condition" to "Reset" resets OUT signal at this timing.**

5. **I/O result output is complete after the time of "Tp+Tf" passes from TACT signal turns off.**

   ▶ Note
   You cannot output the next result while the time of "Tp+Tf" is passing in Parallel mode, and the device is in the status of waiting for output.

When the Handshake Function Is Set to "Yes"

Use STRB signal (PV-T30 -> the external device) and ACK signal (The external device -> PV-T30) in pairs.
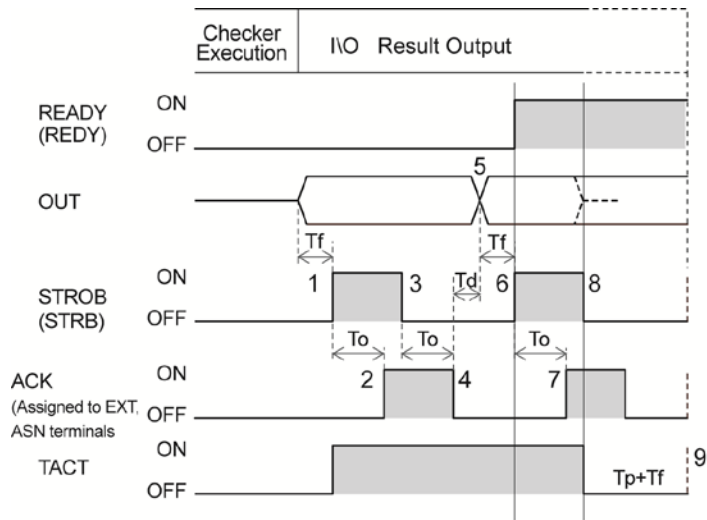
Tf: 400μs (fixed)、Tp: Data output guarantee time, 1-1000ms (default: 10 ms)

To: Timeout period, 4 - 20000 ms (default: 5000 ms)
Exceeding this time causes a timeout error, terminates output processing, and outputs ERR signal.

1. **As the inspection ends, the first data is output through I/O interface and turned on STRB signal and TACT signal.**

2. **As for an external device, obtain the first result after more than 1 ms of wait time(*) when STRB signal turns on, and turn on ACK signal.**

   Be sure to turn on ACK signal in the time of "To" after turning on STRB signal.
   ► Note
   (*) The time from when STRB signal turns on till when the result output (OUT signal) is determined varies according to the condition of the connected load or ambient temperature.

3. **PV-T30 checks that ACK signal is ON and turns off STRB signal.**

4. **Check STRB signal if OFF with the external device and turn off ACK signal in the time of "To".**

5. **PV-T30 outputs the second (last) data in 100μsec (Td) after turning off ACK signal.**

6. **As the time of "Tf" passed from data output, turn on STRB signal and REDY signal.**
   ► Note
   When synchronous output is operated in addition to I/O output, including data output to COM port and Ethernet port, and inspection image output, REDY signal stays OFF until the operation is completed.

7. **As for an external device, obtain the second result after more than 2 ms of wait time(*) when STRB signal turns on, and turn on ACK signal.**

   Be sure to turn on ACK signal in the time of To after turning on STRB signal.

8. **PV-T30 checks that ACK signal is ON and turns off STRB signal and TACT signal. Setting "Parallel I/O Output Reset Condition" to "Reset" resets OUT signal at this timing.**

   Check STRB signal is OFF with the external device and turn off ACK signal. If the time from turning on of TACT signal is less than "Tp", wait until the time passes and turn off TACT signal.

9. **I/O result output is complete after the time of "Tp+Tf" passes from TACT signal turns off.**
   ► Note
   You cannot output the next result while the time of "Tp+Tf" is passing in Parallel mode, and the device is in the status of waiting for output.

1.2 Setting Judgement Conditions

This function totally judges the results of checkers and numerical calculation. A maximum of 100 expressions of judgment can be set per type. Judgement can be displayed on the screen and output to the external devices. In addition, images can be saved according to the judgement and the images can be output to the external devices. A maximum of 100 expressions of judgment can be set per type.

Setting Judgement Conditions

▶ Note

In PVWIN-T30 (PV-T30), the logical product of the checker of a inspection item that has been set is automatically referred to JDC000 and output as the total judgment result. In addition, the reversed value of judgment of JDC001 is automatically referred to JDC001.
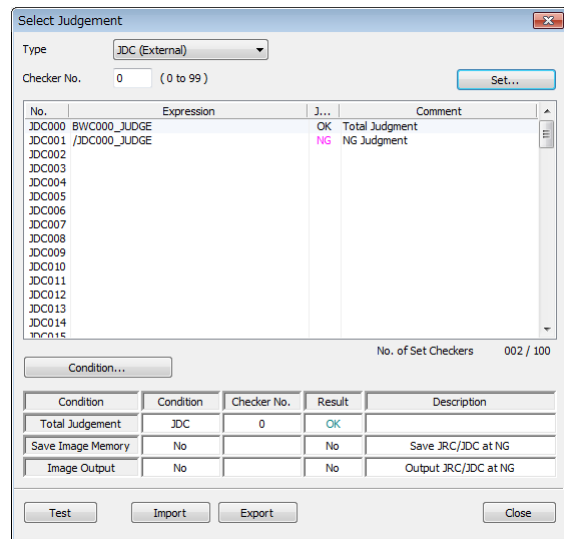
No.	Expression	J...	Comment	▲
JDC000	BWC000_JUDGE	OK	Total Judgment	≡
JDC001	/JDC000_JUDGE	NG	NG Judgment	

Creating a Calculation

1. **Select "INSPECTION" > "Judgement" from the menu bar.**

"Judgement" window is displayed.

2. **Select a type of Judgement to set by [Type].**

Judgement has two types as below. Select them in accordance with your purpose.

JDC (External):   The judgement result can be output to the external device.

JRC (Internal):   The judgement results cannot be output to the external device. The other conditions are the same as that of JDC (External).Use JRC when computing a judgement which is not necessary to be output to the external device.
Example:As a precalculation of JDC (External)As a condition to save images or to output images.

3. **Select a calculation list and a judgement number to set.**

The screen of numerical calculation setting is displayed.

4. Select the numerical calculation input field and press the ENTER key again.

The list of items that can be registered in a calculation is displayed.

Checker:	Select this to input judgements of checkers including Position Adjustment and Area Size Adjustment.
Judgement JRC:	Select this to input a judgement of JRC (Internal). (When you have set a judgement of JRC, you can select only JRC with smaller number than currently setting JRC.)
Judgement JDC:	Select this to input judgement of JDC (External) with smaller number than currently setting judgement number. (When you have set a judgement of JRC, you cannot select JDC.)
Operator:	Select this to input operators such as "AND" and "OR" to judge results totally.
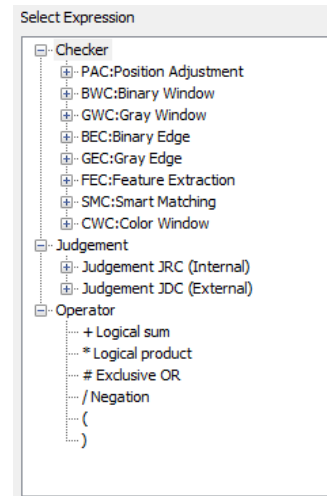
5. Enter an operation expression.

Up to 16 items and 560 characters* can be set.
If you selected a wrong item, delete it with the F2 key and reregister the expression.

▶ Note
Moving the cursor onto an item displays the information of the item in the expression explanation field.

6. Enter a comment with the software keyboard as necessary.

7. After inputting is completed, press the CANCEL key.

8. Press the Cancel key again.

When the dialog message appears, select "Yes".
"Yes": Registers the expression.
"No": Returns to the status before inputting the expression.
"Cancel": Cancels registering the expression and come back to status to edit.
▶ Note
When an expression is incorrect such as a grammatical error, even if you select [Yes], a message appears and registration cannot be executed. Correct the expression in the case.

9. Press the TRIG key to run a test and confirm the updated judgement as necessary.

Selecting Total Judgement Expression

1. **Select "Condition" in judgement output setting window.**

"Condition" setting window is displayed.

2. **Select "Condition" column of Total Judge.**

Select a judgement type to register as a Total Judgement.
[NO]: No Total Judgement
[JRC]: Use a JRC(Internal) as a Total Judgement
[JDC]: Use a JDC(External) as a Total Judgement

3. **Select "Checker No." column and set a judgement number.**

The result of the Total Judgement is displayed in the "Result" column.

4. **After setting is completed, press the CANCEL key.**

Now you completed registering.

		Condition	Checker No. (0 to 99)	Result
	Total Judgment	JDC	0	OK
	Save Image	No		No
	Image Output	No		No

Selecting an Image Output Condition

Inspected images can be saved in the image memory of PV-T30 and output to the external devices when the judgement of the judging checker is "NG" during an inspection. Select a judging checker to be a condition to output images.

▶ Note

This setting is available only when the condition of "Image Output" (or "Save Image Memory") is set to "NG judgement".
(「NG Judgment」‥‥To specify a condition expression to output images. This condition expression is common to all cameras. When judgement is NG, all images of the cameras which is set to "Output" will be output.)

Selecting a Condition Expression of Inspection Image Output

1. **Select "Condition" in judgement output setting window.**

"Condition" setting window is displayed.

2. **Select "Condition" column of Image Output.**

Select a judgement type to register.
[No]:   Images are not output.
[No Condition]:   Always output images regardless of inspection results.
[JRC]:   Use a JRC(Internal) as a condition to image output.
[JDC]:   Use a JDC(External) as a condition to image output.

▶ Note
*Select "No Condition" to temporarily output images regardless of a judgement condition when the image output condition is set to "NG Judgement" or "Judge. Per Cam." which is on the window of "Input/Output" of "ENVIRONMENT".
When the other conditions are selected than "NG Judgement" and "Judge. Per Cam.", the setting of Judgment window is invalid.

3. **Select "Checker No." column and enter a judgement number.**

The status of Image Output is displayed in the "Result" column.
"No" indicates that image output is not executed because the condition is not fulfilled.

4. **After setting is completed, press the CANCEL key.**

Now you completed registering.

1.3 Outputting Inspection Images to External Device

▶ Note

When outputting through Ethernet to a PC, "Image Receiver for PV" needs to be installed in the PC which receives images. You can download the Image Receiver from our web site.

http://panasonic.net/id/pidsx/e

("Products" > "Machine Vision System" > "PV200" > "Software")

Downloading the software requires a user information registration.

Selecting Destination

Outputting to a SD memory card

A folder named as date and time (YYMMDDHHMMSS= year, month, day, hour, minute, second) is created in the following path of a SD memory card and image files are saved in it.（100 files can be saved in per folder）

¥Panasonic-ID SUNX Vision¥PV-T30¥image¥Output¥

1. **Select "SDcard" from the selectmenu [Environment Setting]-[Input/Output]-[Image Output] -[Destination].**

2. **Select "No. of Folders".**

   Initially, decide the number of folders to save images.
   The default is "10" and the range of available value is "1 to 1000".

3. **Set "Overwrite".**

   [No] (Default):   Terminates image saving.

   [Yes]:   Deletes the oldest folder and all images stored in the folder and creates a new folder to continue saving when the number of folders reaches the limit or the space of a SD memory card is used up.

Outputting through Ethernet interface

1. **Select "Ethernet" from the selectmenu [Environment Setting]-[Input/Output]-[Image Output] -[Destination].**

2. **Set [ERR signal ON at Output Error].**

   To turn on the ERROR signal when an error occurs, select "Yes". (Default: No)

3. **Set [Forced Outage at Output Error].**

   [No] (Default):   Continues the inspection.

   [Yes]:   Terminates the inspection. Confirm the connection following the displayed message. When outputting Synchronously, images can be resent.

▶ Note

When the PC has an error, such as uninvoked Image Receiver and disconnection of cables, images cannot be output correctly. Set the operation of PVT30 in such case in step 2-3. When "Output Conditions" is set to "Command Reception", two items described above cannot be selected. In this case, if outputting an image failed, ERROR signal will be output.

Specifying a Camera Image to Output

1. Select "Yes" in "Camera No.0 Output" of "Image Output".

Doing so makes setting that an inspection image of camera No.0 is output.

Selecting Output Condition

Other than outputting by an inspection, images can be output when the specified conditions are fulfilled.

1. Select a condition to output images in "Output Condition".

[All Images](default):	Images are output at every inspection.
[NG Judgement]:	To output all images of the cameras which are set to output when the judegment selected in "Image Output" in "Judgment" is NG. If any condition is not specified, no image is output.
[At Interval]:	Images are output per the specified number of inspections.
[Command Reception]:	Images are output when receiving the certain signal* from external device. * The signal of "Output Latest Image" assigned to one of ASSIGN0-1 and EXTRA0-2.

2. When selecting [At Interval] in Step1, set an interval in "Interval".

The range of available value is 2 to 10000.
Specifying "10" outputs an image at the first inspection, and then outputs every ten inspections as 11th time, 21st time, 31st time…

Selecting Output Timing

1. Set the timing to output images in "Image Output".

Select from "Synchronous" (default), "Asyn. (image output first)", and "Asyn. (sequence first)".

There are two settings; to output images every time one inspection is executed, to output images while PV-T30 is able to output them until the start of the next inspection.

Synchronous:	An inspection is complete after image output is completed. Because the time of outputting images is included, its inspection time is longer than the other two options.
Asynchronous (image output first):	An inspection is complete before outputting images, and then PV-T30 outputs images when it can. When the interval of START signal input (the period between inspection start and the next inspection start) is short, and Image Output is not completed after several inspections, PV-T30 completes Image Output by delaying the next inspection start.
Asynchronous (inspection first):	An inspection is complete before outputting images, and then PV-T30 outputs images when it can. When the interval of START signal input (the period between inspection start and the next inspection start) is short, and image output is not completed, PV-T30 internally stores images up to a certain number as images to be output. If the number of images exceeds the storable capacity, new images cannot be stored in PV-T30 until enough space for storing is created by outputting the images that have been stored in PV sequentially. Inspections are executed on images that cannot be stored, however, image output is not executed.

Selecting Additional Information for a File Name

A file name of image consists of the following information.

Header:	Up to eight characters can be specified.
Additional information 0-3:	Four types of information can be added.
Type No.:	Type No. (000 - 255) when the image is captured.
Date:	The date (yymmdd) of built-in calendar of PV-T30 when the image is captured.
Time:	The time (hhmmss) of built-in calendar of PV-T30 when the image is captured.
Total Judgement:	Total judgement of the image (OK/NG) * Total judgement is other than OK/NG, such as NJ = Unset

| Camera No.: | C0 – C1 (2 digits) Number of the camera which captured the image. (Automatically added) |
| Scan Count: | Scan count: 7 digits (Automatically added) |

▶ Note

Scan Count is reset to "0" by turning on the power, switching type, and resetting statistics data. If the file name of the image to be output after reset is the same as the file name that has been output before reset, it will be overwritten. Adding time or type number to the additional information prevents the file names to be the same.)

1. **Select "Set" in "Image file setting", and enter "File Header" with the software keyboard. Default: "Image_"**

2. **Select an item from four types for "Additional Information 0" to "Additional Information 4".**

Select "None" when no additional information is needed.

▶ Note

Maximum number of digits for a file name is 50.

Selecting Compression Rate of Output Image

1. **Select from "None", "1/2", "1/4" and "1/8" in "Compression".**

Compression rate	Captured image size	Output image size	Output time
None		640 x 480 pixels	
1/2		320 x 240 pixels	Approx. 1/2 of the case of "None"
1/4	640 x 480 pixels	160 x 120 pixels	Approx. 1/4 of the case of "None"
1/8		80 x 60 pixels	Approx. 1/8 of the case of "None"

▶ Note

Compressed images can be automatically decompressed and retrieved with PV-T30 and PVWIN-T30. However, note that the resolution deteriorates.
When the used camera is 0.3-Meaga Compact Color Camera (ANPVC6030), the image size is 640 x 478 pixels, however, the inspection is performed with an image of 640 x 480 pixels. The missing vertical two pixels are filled with black pixels (Gray level 0). It is the same state as when partial imaging is set with another camera.

Selecting a Format to Output Color Images

1. **Select "Bayer Img.   (.byr)" or "RGB Img. (.bmp)" in "Color Image Format".**

▶ Note

Bayer image is an image saved in the same array as an image sensor of a color camera.
As the file size is small and the time for saving is shortened, you should use Bayer Image to save many images.
Files saved in this format (.byr) cannot be confirmed with general applications such as a PC.
Bayer images can be confirmed on PV-T30, PVWIN-T30 or PVImageConverter. Its files size is smaller than that of RGB image (.bmp).