.NET Control Components
Operation Manual

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Contents

1．The Outline of .NET Control Components

.NET control components is the custom control to make the application which is being made in Microsoft ® Visual Studio® indicate measurement image of FH/FZ5 and measuring result display easily.

A custom control is just arranged on the application, and measurement image of FH/FZ5 and factors of result display can be indicated now.

2．Recommendation Working Environment

CPU : Intel Pentium Processor (SSE2 or later)

OS : Windows 7 Enterprise (32bit / 64bit)

Windows 7 Professional (32bit / 64bit)

Windows 7 Ultimate (32bit / 64bit)

Windows 8 Pro (32bit / 64bit)

Windows 8 Enterprise (32bit / 64bit)

Windows 8.1 Pro (32bit / 64bit)

Windows 8.1 Enterprise (32bit / 64bit)

Windows 10 Pro (32bit／64bit) (from Version.6.21)

Windows 10 Enterprise (32bit／64bit) (from Version.6.21)

.Net Framework : .Net Framework 3.5 or later

Memory : 2GB or higher recommended.

Hard disk free space : 2GB or higher.

Display screen: XGA(1024x768),True Color(32bit) or higher.

3．Necessary Condition

Microsoft ® Visual Studio ® 2008 or 2010 or 2012 Professional

FH/FZ5 Simulation Software Ver.6.21 or higher

FH/FZ5 Sensor Controller with firmware Ver. 6.21 or higher

4．Corresponding Programming Language for Software Development

Visual Basic .NET

Visual C#

５．Outline of Functions

.NET control components consist as follows:

Control components	Definition
CoreRA	It's exchanged with simulation software of made application and connected FH/FZ5 or Sensor Controller. When using ImageWindow and TextWindow .NET control components, add this control component certainly.
ImageWindow	Displays measurement image of designated unit.
TextWindow	Indicates Measuring result of designated unit.
PanDAWindow	Display a main screen remote-controling.

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6．Restriction

.NET Control Components includes the following restrictions. Be careful to use.

■Macro command

In Macro DirectExecute of CoreRA control components, do not use anything but the command which is indicated on "8－2．The Macro Command List Which Can Be Carried Out in Macro_DirectExecute".

■32bit / 64bit Applications

Applications using CoreRA control, when it is running in 32bit mode, FZ application of 32bit version only can be specified.

Applications using CoreRA control, when it is running in 64bit mode, FZ application of 64bit version only can be specified.

OS	Target CPU	Operation mode	FZ applications that can be specified in FZPath	Remotely operable FZ applications
32bit	Any CPU	x86	x86	x86／x64
	x86	x86	x86	x86／x64
64bit	Any CPU	x64	x64	x86／x64
	x86	x86(WOW64)	x86	x86／x64
	x64	x64	x64	x86／x64

* PanDAWindow control is no restrictions above.

■MeasureStart at startup (from Version.5.30) **[IMPORTANT]**

For local connection when the main form is not running, the MeasureStart is not running. When it is to ready to perform the measurement, you need to start the MeasureStart from the user's application using Macro_DirectExecute.

If the MeasureStart doesn't start, normal operation can't be.

■Remote operation

In the remote operation, the following state is out of warranty.
 - Cable disconnection.
 - The forced termination by power-off.
 - The forced termination by shutdown

■Restriction of using PanDAWindow

PanDAWindow control and TextWindow control can not be used together.

When used in combination PanDAWindow control and ImageWindow control, please use a different WindowNo.

## 7．Procedure

7－1．Add of Control Components to Application

The way to add .NET control components to the form of application is explained.

[Procedure]

(1) Open a project of form application in Visual Studio®.

(2) Drag and drop is done to "General" part of "FZ-Control.dll", of toolbox of Visual Studio®" (to the following figure red frame part) to add .NET control components to the toolbox.
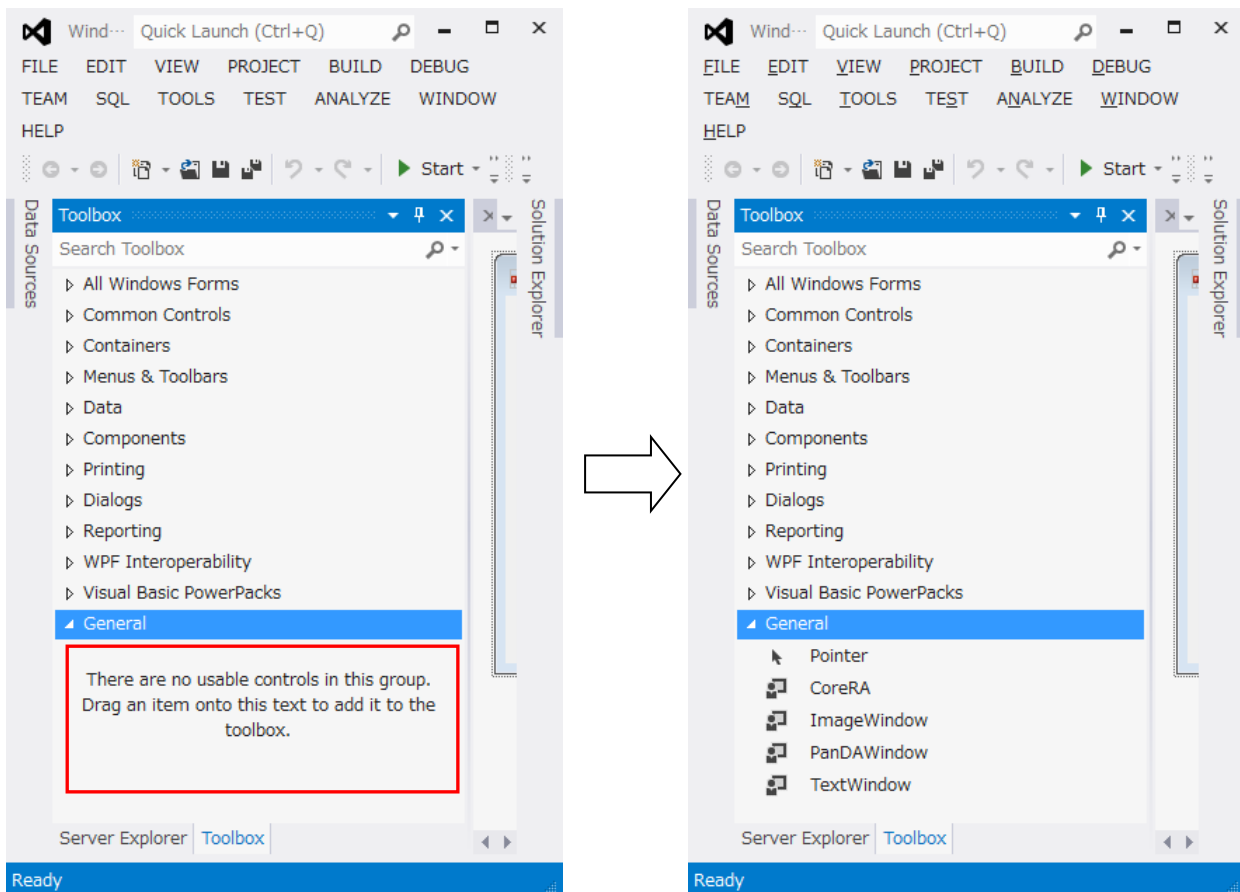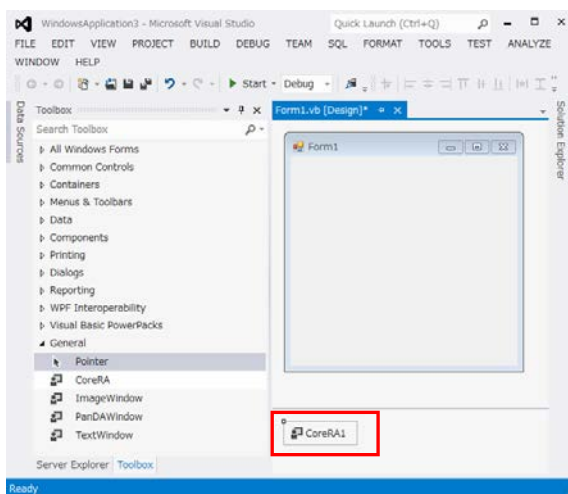
(3) Implements .NET control components on the form of the application.

Drag and drop chosen control components by Toolbox to the form of the application.
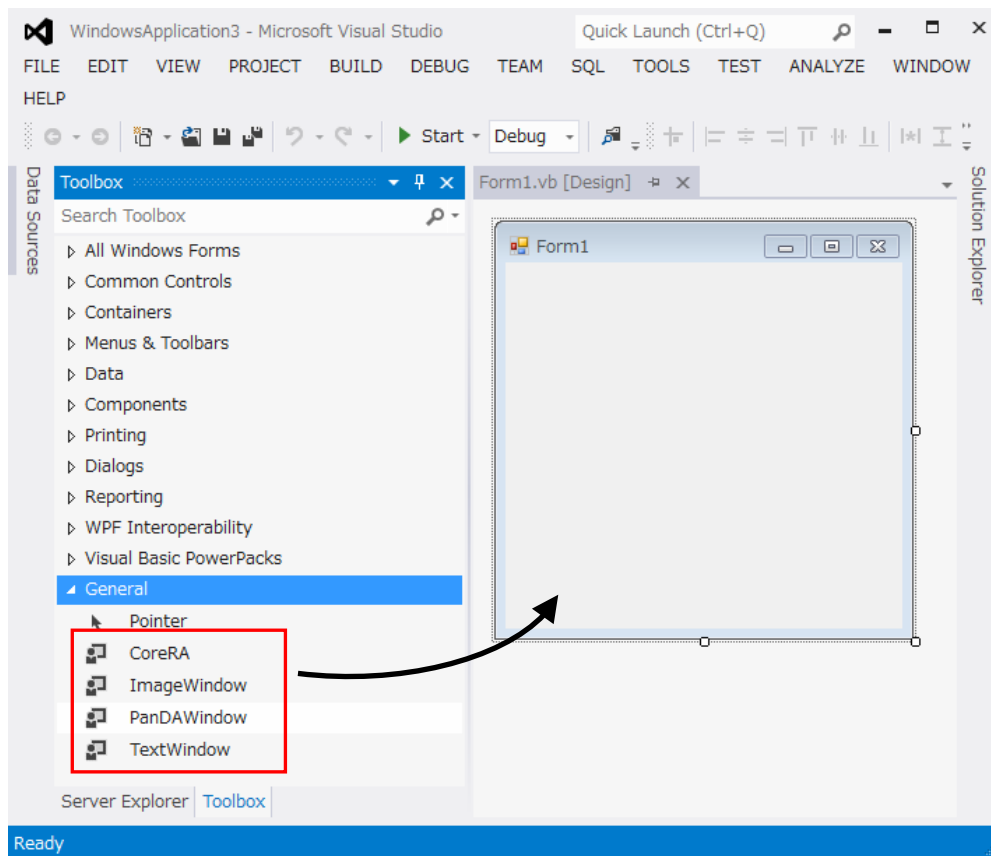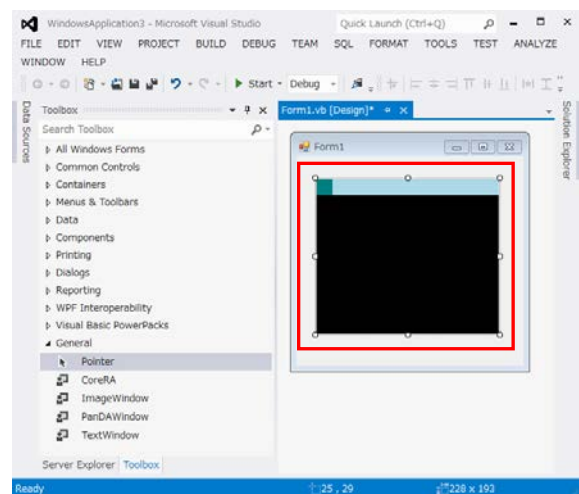

The respective control components are added like the red frame part of the following figure on the form designer.

■CoreRA control components

■ImageWindow control components
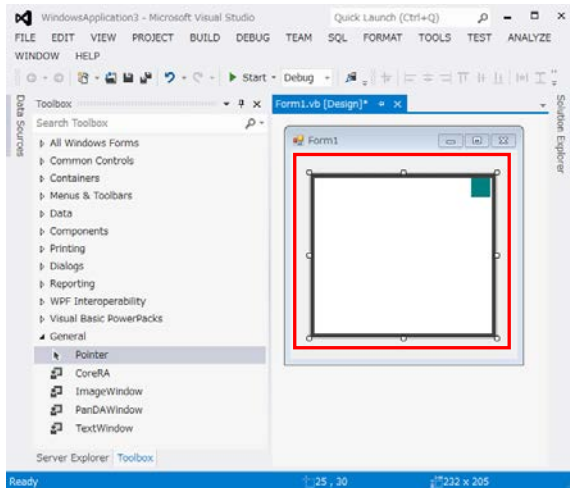
■TextWindow control components　　　　　　　■PanDAWindow control components
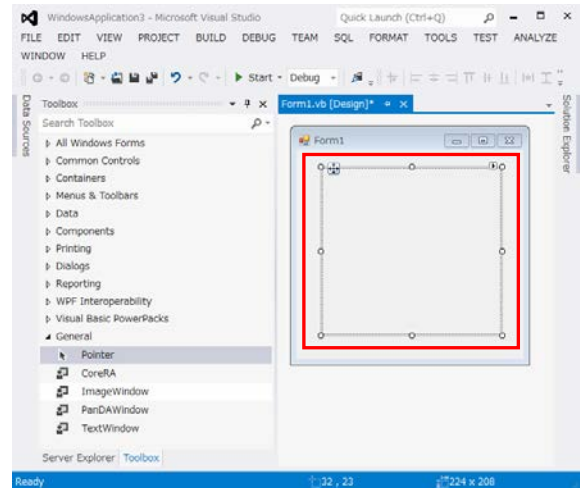
※ As for usage of each control components, refer to Appendix "8－1. Usage of .NET Control Components".

■ Change of display language

A display language of ImageWindow, TextWindow control components on the application can be established by descripting the following code (VB.NET).

OS language setting is in the Japanese, display language is displayed in Japanese. The setting is in the other language, it is displayed in English.

－　English display

```
System.Threading.Thread.CurrentThread.CurrentUICulture _
 = System.Globalization.CultureInfo.GetCultureInfo("en")
```

－　Japanese display

```
System.Threading.Thread.CurrentThread.CurrentUICulture _
 = System.Globalization.CultureInfo.GetCultureInfo("ja")
```

7－2．Execution of Application

It's explained about an execution method of made application.

※ It's carried out in the state for which the following file/a folder was stored up in the same folder as an executable file of application.

File/folder	Definition
FZ-Control.dll	It's necessary dll to use .NET control components.
ja folder	It's necessary folder to display Japanese on the .NET control components.
en folder	It's necessary folder to display English on the .NET control components.

■ Connect or disconnect with FH/FZ5 simulation software

[Connect]

(1) FH/FZ5 simulation software connected with application is started.

(2) Application is started.

(3) Sets property of CoreRA control components on the application.

(4) Call the ConnectStart method of the CoreRA control components and connects with the simulation software.

Example

When pressing buttons, FH/FZ5 simulation software is connected with setting of a property of CoreRA control components

```
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click
    ' Setting property
    Me.CoreRA1.FzPath = "C:¥Program Files¥OMRON¥FZ_FH"
    Me.CoreRA1.ConnectMode = FZ_Control.ConnectionMode.Local
    Me.CoreRA1.LineNo = 0

    ' Connect to FH/FZ5
    Me.CoreRA1.ConnectStart()
End Sub
```

※ Even if (2) replaces a procedure with the above procedure (1), it's possible to make them connect.

※ After carrying out a procedure of the following [disconnect] when failing in connection, please connect once again.

[Disconnect]

(1) Ends an application software.

■Remote connect or disconnect with FH/FZ5 Sensor Controller

[Connect]

(1) FH/FZ5 Sensor Controller connected with application is started.

(2) FH/FZ5 Sensor Controller is made the setting you can control by remote control.

(Please refer to the setting of the network in [the Vision System FH/FZ5 Series User's Manual] Remotely Operating the Controller (Remote Operation) .)

(3) Application is started.

(4) Sets property of CoreRA control components on the application.

(5) Call the ConnectStart method of the CoreRA control components and connects with Sensor Controller.

Example

When pressing buttons, FH/FZ5 Sensor Controller is connected with setting of a property of CoreRA control components

```
Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles Button1.Click
    ' Setting property
    Me.CoreRA1.FzPath = "C:\Program Files\OMRON\FZ_FH"
    Me.CoreRA1.ConnectMode = FZ_Control.ConnectionMode.Remote
    Me.CoreRA1.IpAddress = "10.5.5.100"
    Me.CoreRA1.LineNo = 0

    ' Connect to FH/FZ5
    Me.CoreRA1.ConnectStart()
End Sub
```

※ Even if (3) replaces order with the above procedure (1) and (2), it's possible to make them connect.

※ After carrying out a procedure of the following [disconnect] when failing in connection, please connect once again.

[Disconnect]

(1) Ends an application software.

8．Appendices

8－1．Usage of .NET Control Components

■CoreRA control components

It's exchanged with the made application software and FH/FZ5 simulation software or FH/FZ5 Sensor Controller.

・Property

Property	Definition
ConnectMode	Set a connection target. 　Local: connected to FH/FZ5 simulation software. 　Remote: connected to FH/FZ5 Sensor Controller.
FzPath	Set folder of the simulation software used for connection. An example "C:¥Program Files¥OMRON¥FZ_FH" ※ When connecting to Sensor Controller, folder setting of simulation software on the PC is needed.
IpAddress	Set IP address of Sensor Controller of FH/FZ5 of connection target. When connecting to simulation software of FH/FZ5, it's ignored.
LineNo	Set the line number which becomes connection target. The line number which can be connected will be as follows by operation mode. * Multi-line random trigger mode: 0-7 * High-speed logging mode: 0
IsConnected	Give back a connection state. It becomes connected once when it connected when it is Unconnected. (Read only) 　True: Under connection 　False: Unconnected
DispImageTransferSize	Set the resolution of the display image. When ConnectMode property is Remote, this setting is valid. When ConnectMode property is Local, this setting is invalid. The default value is 320. Update of the image is not done in this property. To reflect the change, need to update the image separately.

・The method

Method	Definition
ConnectStart	Connection is tried to FH/FZ5 simulation software ahead of the connection or Sensor Controller with setting factors of a

	property.
	ImageWindow and TextWindow control components indicate measurement factors of FH/FZ5 after connection success.
	■Return
	Connection enforcement:Success = 0
	Designated path does not exist : DirectoryNotFoundError = 1
	Failed by connection processing : InvalidArgumentError = 3
Macro_DirectExecute	Described macro in argument commandline is carried out on FH/FZ5.
	When It connected to the plural lines by the same process, this method cannot use.
	■ Argument
	Commandline: The macro description which carries out.
Macro_GetVariable	The value of the macro symbol designated in argument variableName is acquired as a character string. It is used when acquiring the value of the macro symbol carried out in Macro_DirectExecute.
	■ Argument
	variableName: Macro variable (name) of data acquisition target (input argument)
	data: Acquisition result character string (output argument)
	maxLength: The number of elements of the string array for acquisition result acquisition (input argument)
Macro_SetVariable	Value is established to the value of the macro symbol designated in argument variableName.
	■ Argument
	variableName: Macro variable (name) of data acquisition target (input argument)
	data: setting subject data character string (input argument)

※The above mothod except "ConnectStart"method moves only in the state with which CoreRA control components and FH/FZ5 are already connected.

・Event

Event	Definition
FzPathChanged	It occurs when the FzPath property was changed.
ProcessStarted	It occurs when connection with FH/FZ5 succeeded by the ConnectStart.
ErrorProc	It occurs when the following error occurred on the FH / FZ5. Notified error contents and error code is are as follows.
	0: System error

	1: System error (Fan voltage error)
	10: Camera connection error
	11: Connected camera has been changed
	12: Detection of camera over current
	13: Configuration error of light device connection
	20: Loading error of image logging dick
	30: Time out of parallel output
	31: PLC link communication error
	32: Detection of parallel I/O camera over current
	40: Data load error
	41: Data transfer error
	42: Incorrect number of start-up Scene group
	43: Incorrect number of start-up Scene
MeasureDisp	It occurs when measuring result was displayed on the FH/FZ5.
MeasureInit	It occurs when a measurement initializing process was carried out. When BUSY signal becomes OFF from ON in the center such as the opening and shutting of setting screen and the execution time of command, a measurement initializing process occurs. But, it doesn't occur when measurement command was executed.
MeasureOut	It occurs when measuring result was output.
OptionEvent	When an optional event occurred on FH/FZ5 of the connection, it occurs.
SceneChange	It occurs when scene change processing was carried out on FH/FZ5.

※ CoreRA control components and FH/FZ5 generate the above event only in the state which is already connected.

■ ImageWindow control components

It's possible to indicate a picture of measuring result of designated unit on the application. It's possible to use even 64 on the form by designating the respective peculiar numbers by a WindowNo property.

* When used in combination PanDAWindow control and ImageWindow control, please use a different WindowNo.

・Property

Property	Definition
ConnectCoreRAComponent	Set the CoreRA control components used for connection.
ImageOrigin	Set the upper left coordinate of a display image to window upper left coordinate.
ImageVisible	Set a display presence of the window of image display. 　0: window nondisplay 　1: window display
Magnification	Set the display magnification of the image display. The display magnification is designated by real number. Example -Set "0.5" when indicating it reducing half. -Set "2.0" when expanding to double. -When designating -1, It'll be the automatic magnification added to the window size.
SubNo	Set the sub-number of the display unit. When designating "-1", it'll be location list timer mode from the designated processing unit to the processing unit just before the next image input relation, and made the display target.
UnitNo	Set processing unit number of display item. When designating "-1",the processing unit chosen at present on FH/FZ5 of connection item is displayed.
UpdateImage	Set the timing of a renewal of a display image. The time of FREEZE: it is renewd each measurement time (freeze display) NG_IMAGE: it is renewed when it's overall judgment result is NG. THROUGH: It is always renewed (It's indicated through.)
WindowNo	Set the window number of 0-63. It's necessary to establish the peculiar number in the form.
WheelZoomEnabled	Set the mouse wheel operation Enable/Disable. 　True: Enable 　False: Disable

■ TextWindow control components

　It's possible to indicate measuring result of designated unit Only 1 of this control components can make them carry out on 1 of CoreRA control components.

　　* PanDAWindow control and TextWindow control can not be used together.

・Property

Property	Definition
ConnectCoreRAComponent	Set CoreRA used for connection (component).
UnitNo	Set processing unit number of display subject. When designating "-1", the processing unit chosen at present on FH/FZ5 of connection target is displayed.
FontSize	As for these present conditions property, setting is ignored.

■PanDAWindow control components

　Display it in the range of the control that located a main screen remote-controling in designers.

　＊ What can be connected by this control only at the time of the remote connection with the FH/FZ5 Sensor Controller.

　＊ From a menu in the control cannot be finished.

　* PanDAWindow control and TextWindow control can not be used together.

　* When used in combination PanDAWindow control and ImageWindow control, please use a different WindowNo.

・Property

Property	Definition
FzPath	Set folder of the simulation software used for connection. An example "C:¥Program Files¥OMRON¥FZ_FH"
IpAddress	Set IP address of Sensor Controller of FH/FZ5 of connection target.
LineNo	Set the line number which becomes connection target. The line number which can be connected will be as follows by operation mode. * Multi-line random trigger mode: 0-7 * High-speed logging mode: 0
IsConnected	Give back a connection state. (Read only) 　True: Under connection 　False: Unconnected
Title	It return the title character string of a main window connecting.

	(Read only)

・The method

Method	Definition
ConnectStart	Connection is tried to FH/FZ5 simulation software ahead of the connection or Sensor Controller with setting factors of a property. ■Return Connection enforcement:Success = 0 Designated path does not exist : DirectoryNotFoundError = 1 Failed by connection processing : InvalidArgumentError = 3

8－2. The Macro Command List Which Can Be Carried Out in Macro_DirectExecute

A list of the command which can be carried out in Macro of CoreRA control components_DirectExecute.

Please refer to FH/FZ5 user's manual for further information.

The command which has "※" in Function, run of the MeasureStop command is necessary before command run. And run of the MeasureStart command is necessary after command run.

●General Instruction

Function	Command Name
Defines the array variables.	Dim
Free the array variable memory region that was defined by the Dim command.	Erase

●Arithmetic Calculation

Function	Command Name
Get the absolute value of the expression specified.	Abs(Function)
Get the logical product (AND) of 2 specified expressions.	And(Function)
Get the arc tangent of the expression specified.	Atn(Function)
Gets the cosine of the specified expression.	Cos(Function)
Gets the intersection between 2 straight lines.	Crspoint
Get the shortest distance between the specified line and 2 points.	Dposline(Function)
Calculate exponential function.	Exp(Function)
Truncates everything after the radix point and gets the integer value.	Fix(Function)
Converts the numeric value given into an integer value.	Int(Function)
Gets the natural logarithm value.	Log(Function)
Gets the approximate line from multiple point coordinates using the method of least squares.	Lsqumeth
Gives the remainder.	Mod(Function)
Gets the negation result of the expression.	Not(Function)
Gets the logical sum of 2 expressions.	Or(Function)
Gets the sine of the specified expression.	Sin(Function)
Gets the square root.	Sqr(Function)
Gets the tangent of the specified expression.	Tan(Function)
Gets the exclusive disjunction (exclusive-OR) of 2 expressions.	Xor(Function)

●String Operation

Function	Command Name
Get the value of the character code for the specified character.	Asc(Function)
Gets the character corresponding to the character code.	Chr$(Function)
Converts the value of the expression to a character string hexadecimal expression.	Hex$(Function)
Convert the capital letter into a small letter.	LCase$(Function)
Fetches the specified character string length from the left of the character string.	Left$(Function)
Gets the length of the specified character string.	Len(Function)
Fetches a part of the character string.	Mid$(Function)
Fetches the specified part separated by the specified character from the character string.	Piece$(Function)
Fetches the specified character string length from the right of the character string.	Right$(Function)
Converts a numeric value into a numeric character string.	Str$(Function)
Converts to a numeric character string with the numeric value format specified.	Str2$(Function)
Convert a small letter into a capital letter.	UCase$(Function)
Converts the number of a character string notation into a numeric value.	Val(Function)

●Measurement Control

Function	Command Name
Clear processing unit measure data.※	ClearMeasureData
Gets whether the measurement result is output.	GetMeasureOut(Function)
Update image	ImageUpdate
Permit the measurement execution.	MeasureStart
Forbid the measurement execution.	MeasureStop
Executes the measurement.	Measure
Executes Re-Measurement Processing.	Remeasure
Set the output mode of the measurement result.※	SetMeasureOut

●Display Control

Function	Command Name
Gets the image/text display processing unit number	DisplayUnitNo(Function)
Update the indication of the image display window	RefreshImageWindow

Function	Command Name
Update the indication of the text display window	RefreshTextWindow
Update the indication of the judgement result display window.	RefreshJudgeWindow
Update the indication of the measurement processing time display window.	RefreshTimeWindow
Set the processing unit number of image / text window	SetDisplayUnitNo

●Save/Load

Function	Command Name
Load the system data.※	LoadSystemData
Load the scene group data.※	LoadSceneGroup
Load the scene data.※	LoadScene
Load the processing unit data.※	LoadUnitData
Load the system + scene group data.※	LoadBackupData
Save the system + scene group data	SaveBackupData
Saves data to a controller	SaveData
Save the scene group data	SaveSceneGroup
Save the scene data	SaveScene
Save the system data	SaveSystemData
Save image data	SaveImage
Save the processing unit data	SaveUnitData

●Control Global Data

Function	Command Name
Adds global data.※	AddGlobalData
Get global data.	GetGlobalData
Sets global data.※	SetGlobalData

●Control System Data

Function	Command Name
Adds system data.※	AddSystemData
Gets system data.	GetSystemData
Sets system data.※	SetSystemData

●Control Scene

Function	Command Name

Change scene number.※	ChangeScene
Clear the scene number.※	ClearScene
Copy the scene data.※	CopyScene
Gets the available scene number	SceneCount(Function)
Gets the explanation of the scene	SceneDescription$(Function)
Gets the scene creator name	SceneMaker$(Function)
Get the current scene number	SceneNo(Function)
Gets the scene title name	SceneTitle$(Function)
Set the explanation of the scene.※	SetSceneDescription
Set the scene maker name.※	SetSceneMaker
Set the scene title name.※	SetSceneTitle

●Control Scene Group

Function	Command Name
Change scene group number.※	ChangeSceneGroup
Clear the specified scene group.※	ClearSceneGroup
Copy the scene group data.※	CopySceneGroup
Gets the number of available scene groups	SceneGroupCount
Gets the current scene group number	SceneGroupNo
Gets the scene group title name	SceneGroupTitle$(Function)
Set the scene group title name.※	SetSceneGroupTitle

●Flow Control

Function	Command Name
Register a processing unit. .※	AssignUnit
Copy the processing unit.※	CopyUnit
Delete the processing unit.※	DeleteUnit
Insert the processing unit.※	InsertUnit
Move the processing unit.※	MoveUnit
Gets the enrollment number of the processing unit	UnitCount(Function)

●Control Processing Item

Function	Command Name
Gets the number of the available processing items	ItemCount(Function)
Gets the Distinguished Name of the processing item	ItemIdent$(Function)
Gets the information of the processing item	ItemInfo(Function)

Function	Command Name
Gets a title name of the processing item	ItemTitle$(Function)

●Control Processing Unit

Function	Command Name
Copy the processing unit figure data.※	CopyUnitFigure
Copy the processing unit model data.※	CopyUnitModel
Gets processing unit image size	GetImageSize
Gets processing unit data	GetUnitData
Gets processing unit figure data	GetUnitFigure
Gets processing unit figure format	ImageFormat(Function)
Sets processing unit data.※	SetUnitData
Sets processing unit figure data.※	SetUnitFigure
Sets the processing unit title name.※	SetUnitTitle
Gets processing unit data (character string)	UnitData$(Function)
Gets processing unit data (numeric value)	UnitData(Function)
Gets processing unit information	UnitInfo(Function)
Gets the processing item ident name of processing unit	UnitItemIdent$(Function)
Gets the judgement result of the processing unit	UnitJudge(Function)
Gets the processing unit title name	UnitTitle$(Function)

●Debug Command

Function	Command Name
Writes data (macro console).	Print

●Others

Function	Command Name
Raises the optional event	RaiseOptionEvent
Save the capture of the screen	ScreenCapture
Starts the elapsed time measurement	StartTimer(Function)
Gets a processing time	Timer(Function)

Revision history

Date	Contents	Related page
2013/07/31	The 1st edision	－
2014/02/24	The 2nd edision. Add about function addition of 5.20	－
2014/06/25	The 3rd edition. Add about function addition of 5.30 (Addition and modification of the chapter 2, 5, 6, 7and 8).	－
2015/09/04	The 4th edition. Add about function addition of 5.50 (Addition and modification of the chapter 6 and 8).	－
2018/12/12	The 5th edition. Add about function addition of 6.21 (Addition and modification of the chapter 2).	－