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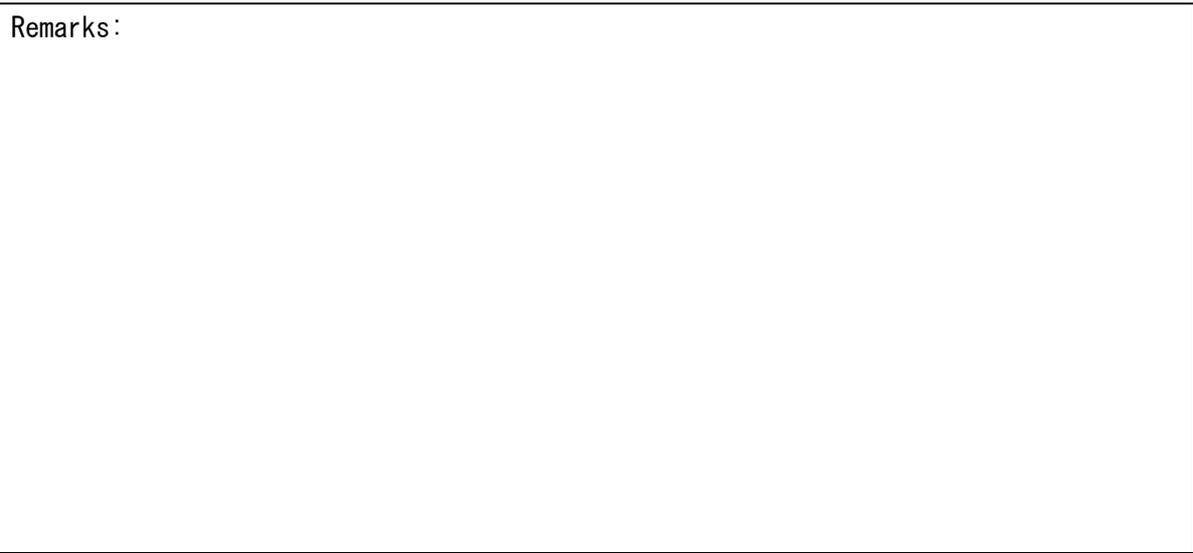
Yaskawa Electric Mfg. Co., Ltd.  
YASKAWA MOTOCOMES provider

**Version 1.0.0**

**User's guide**

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Remarks:



**【 Revision history 】**

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1.0.0	2018-09-20	First edition.

**【 Operation check model 】**

Model	Version	Notes
DX100 SIA30D TYPE:ERDR-SIA030D-A00	---	

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## 1. Introduction

This book is an user's guide of the provider of data that acquires and sets it against control board YRC1000 for industrial robot MOTOMAN of Yaskawa Electric Mfg. Co., Ltd., YRC1000micro, DX200, DX100, FS100, and FS100L (Following FS100L are assumed to be FS100). The control board for industrial robot MOTOMAN of Yaskawa Electric Mfg. Co., Ltd. is named YRC at the following. Client PC operates on Windows, and the environment with which targeted YRC can connect Ethernet is assumed. Figure1-1However, it becomes a whole of device block diagram with [hon] provider. This provider is named YASKAWA MOTOCOMES provider later.

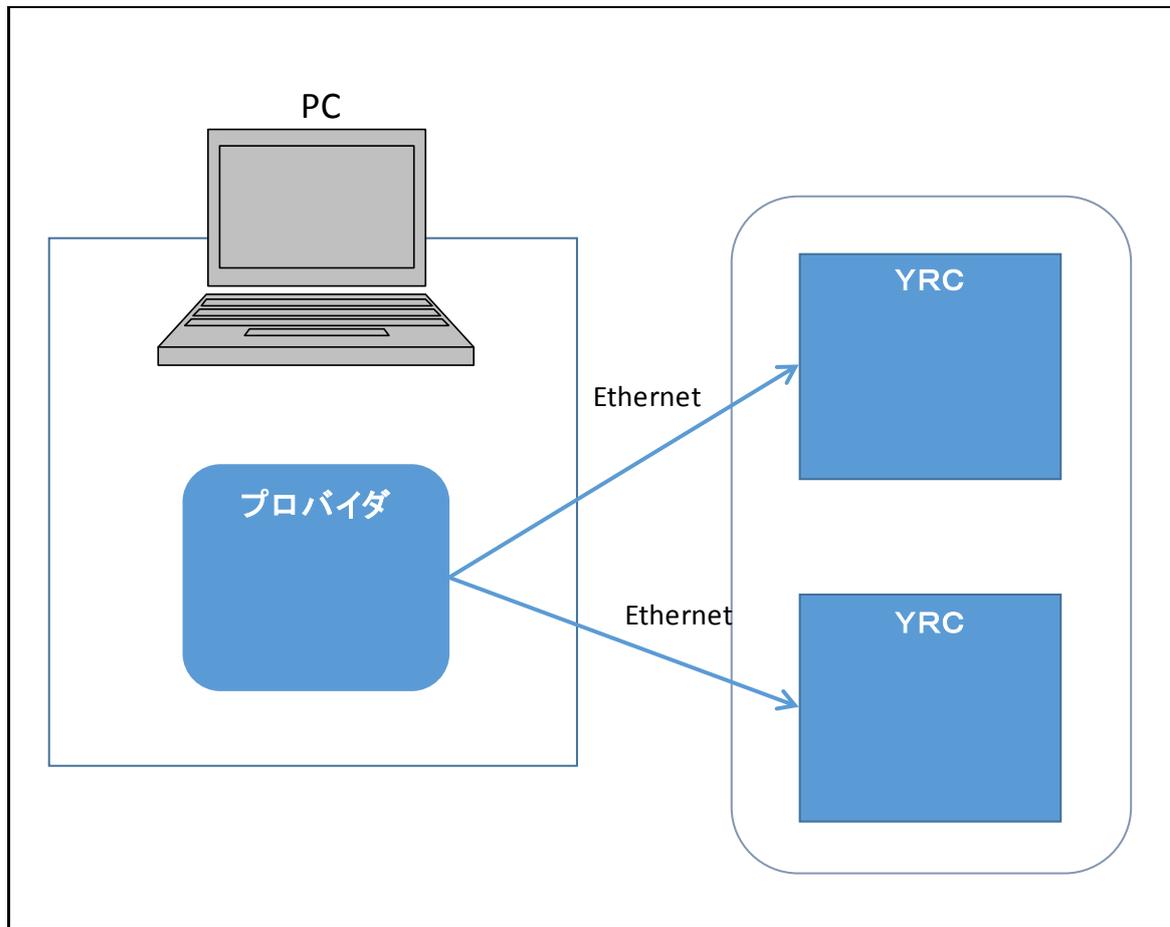


Figure1-1Block diagram

Moreover, this provider and the example of each device's corresponding Figure1-2[Ni] is shown.

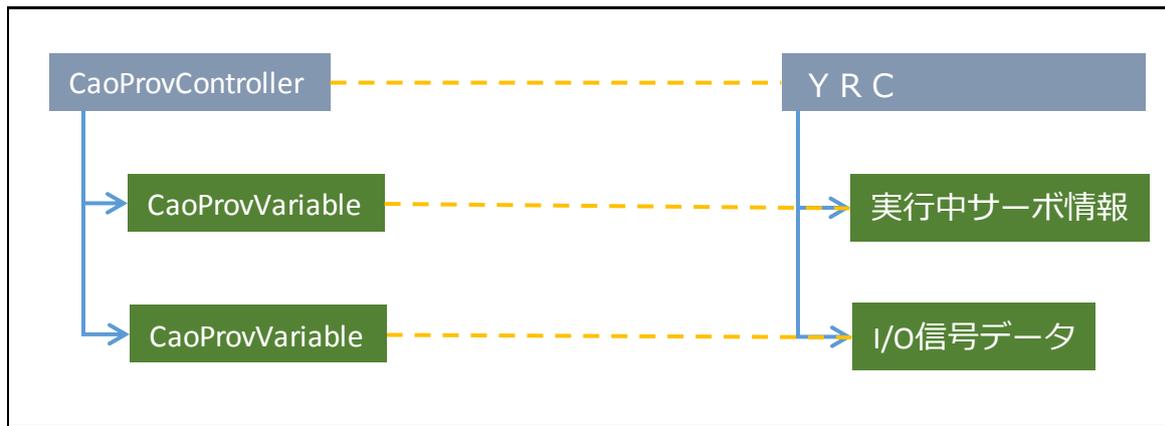


Figure1-2YASKAWA MOTOCOMES provider and correspondence chart with YRC

### 1.1. Source that becomes reference

The YASKAWA MOTOCOMES provider is developing referring to "MOTOCOM ES operation points book (The file name: MOTOCOMES\_jp.pdf)" that accompanies the MOTOCOMES library being offered by Yaskawa Electric Mfg. Co., Ltd.. This manual is named MOTOCOMES manual later.

The future reference

MOTOCOMES\_jp.pdf (material number HW1483704)

## 2. Environmental setup for application development

### 2.1. Connection of YRC and client PC

YRC and client PC are connected by the Ethernet communication by the MOTOCOMES library.

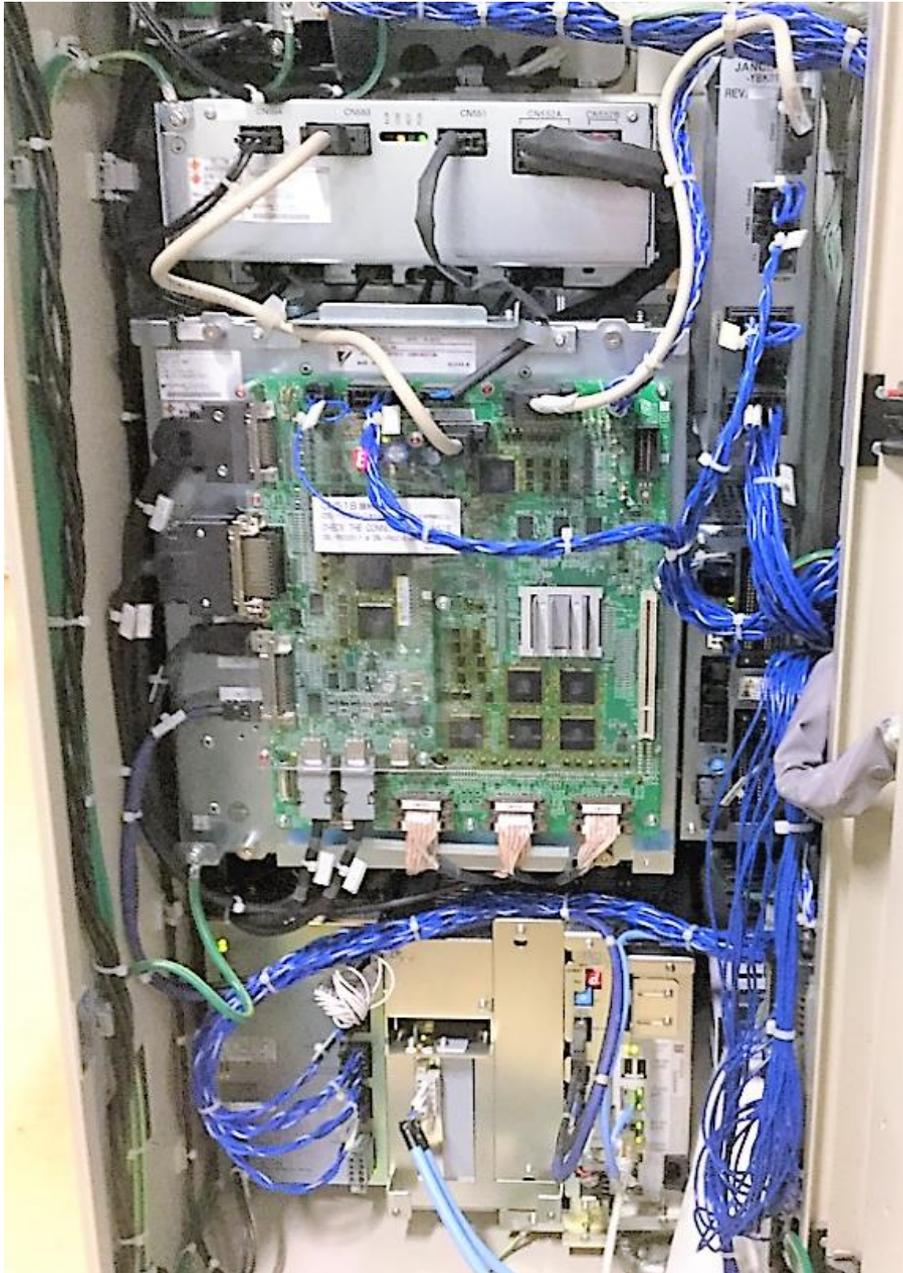


Figure2-1Control board

Set YRC and client PC referring to "2.2 the environmental setting when Ethernet is used" of the MOTOCOMES manual after connecting LAN cable.

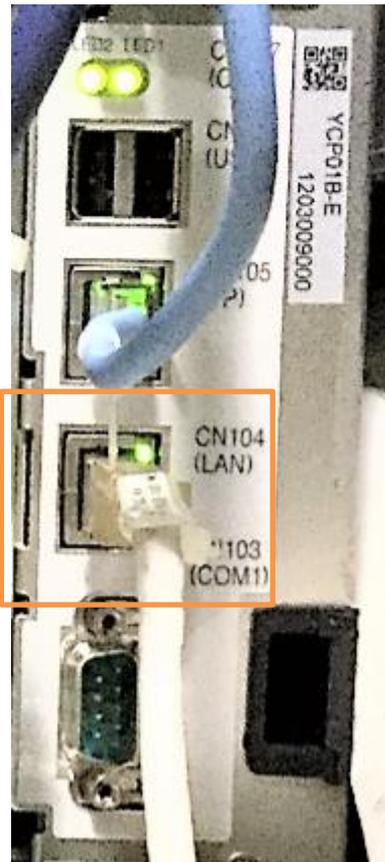


Figure2-2Connection of LAN cable

## 2.2. Setup of client PC development setting

### 2.2.1. Preparation for MOTOCOMES library

It is necessary to install the MOTOCOMES library being offered by Yaskawa Electric Mfg. Co., Ltd. in client PC to install the YASKAWA MOTOCOMES provider in client PC beforehand. Arrange the following file in C:\Windows\System32 for 32bit OS after installing the MOTOCOMES library and arrange it in C:\Windows\SysWOW64 for 64bit OS.

Table2-1Necessary MOTOCOMES library

DLL	Version	Explanation
MOTOCOMES.dll	3.1.0.0	Data transmission function library
Motolk.dll	5.0.0.0	Library necessary for MOTOCOMES library
MotoLkr.dll	0.5.0.0	Library necessary for MOTOCOMES library

### 2.2.2. Manual installation of YASKAWA MOTOCOMES provider

It is necessary to register the following registry when installing it by the hand work to

use the YASKAWA MOTOCOMES provider. Start the command prompt by the manager authority, and execute the regsvr32 command when you register the registry.

Table2-2YASKAWA MOTOCOMES provider

File name	CaoProvYASKAWAMOTOCOMES.dll
ProgID	CaoProv.YASKAWA.MOTOCOMES
Registry registration	regsvr32 CaoProvYASKAWAMOTOCOMES.dll
Blotting out of registry registration	regsvr32 /u CaoProvYASKAWAMOTOCOMES.dll

## 3. Command reference

### 3.1. Method/property list

Table3-1Method/property list

Category	Method/property		Function	Reference
<b>CaoWorkspace</b>				
	AddController	M	Connect it with the controller.	P. 10
<b>CaoController</b>				
	VariableNames	P	Acquisition of variable identifier list that can be connected	P. 12
	AddVariable	M	Addition of variable object	P. 12
<b>CaoVariable</b>				
	Value	P	Acquisition/setting of value	P. 13

### 3.2. Method property

#### 3.2.1. CaoWorkspace class

##### 3.2.1.1. AddController method

Connect it with corresponding YRC referring to the parameter passed when the AddController method is executed. The specification of the AddController method is shown as follows.

#### Format

##### CaoController AddController

```
(
    "< controller name >"           // Controller name (arbitrariness)
    "CaoProv. YASKAWA. MOTOCOMES", // Provider name (fixation)
    "< machine name >"               // Provider execution machine name
    "< option >"                     // Optional character string
)
```

#### Option

The option specified for an optional character string is shown as follows. An optional character string becomes a character string to which each option shown in the following ties

<sup>1</sup> M: method, P: property, E: event.

by comma (,).

Option	Indispensability	Explanation	Range of value	Default value
Conn	–	Specify Ethernet optional connection to connect it with YRC. Please refer to 3.2.1.1.1 for details.	--	--
CntIType	–	Specify a controller optional type to connect it with YRC. Please refer to 3.2.1.1.2 for details.	1 - 5	--

#### Usage example

```
Dim engine As CaoEngine      Engine ..'.. object
Dim workspace As CaoWorkspace  Workspace ..'.. object
Dim controller As CaoController  Controller ..'.. object

Set engine = New CaoEngine
Set workspace = engine.Workspaces.Item(0)
Set controller = workspace.AddController("Controller", _
                                         "CaoProv. YASKAWA. MOTOCOMES", _
                                         "", _
                                         "Conn=eth:192.168.255.1, CntIType=1")
```

#### 3.2.1.1.1. Conn is optional.

Connected parameter character string of optional Conn is shown as follows. It is shown to omit it here in the brace) and the underlined part under the explanation of each parameter shows the default value when the option is not specified respectively.

In the MOTOCOMES library, the port number of 10040 and 10041 is used. Confirm "Personal computer controller/commonness of 2.3.1 robots" of the MOTOCOMES manual. You may not specify the connection destination port because it cannot change in the port number.

The under line shows the default value.

"Conn=Eth:<IP>[:<Port>]"

<IP> : Connection destination Internet Protocol address.

<Port> : Connection destination port.

#### 3.2.1.1.2. CntIType is optional.

The controller type parameter character string of optional CntIType is shown as follows.

Controller of object	Value of option
DX100	1
FS100	2
DX200	3
YRC1000	4
YRC100micro	5

### 3.2.2. CaoController class

#### 3.2.2.1. VariableNames property

Acquire the variable identifier list. Describe the variable identifier acquired in this property later.

It can be used as the first argument of the AddVariable method described later.

#### Usage example

```

..'.. connection
Call Connect

File name list ..'.. acquisition
Dim variables as Variant
variables = controller.VariableNames

..'.. cutting
Call Disconnect

```

#### 3.2.2.2. AddVariable method

Add the variable object to CaoController.

Only variable names shown in 3.3.1 can be used for variable names.

The specification of AddVariable is shown as follows.

#### Format

#### CaoVariable AddVariable

```

(
    "< variable identifier >"           // Variable identifier
    "< option >"                       // Optional character string (It is possible to omit it).
)

```

### 3.2.3. CaoVariable class

#### 3.2.3.1. Value property

Acquisition/set data from connected YRC. Operation is different depending on the variable identifier. Please refer to 3.3 for details.

### 3.3. Variable list

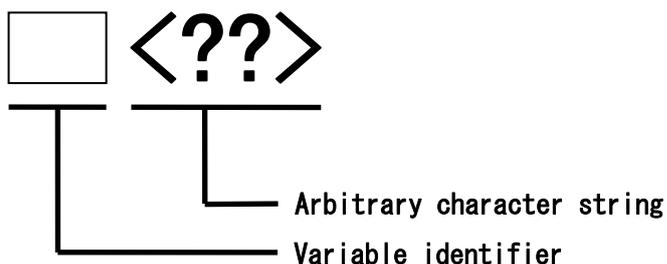
Define the variable list that can be used in each class. The variable indicates the object of the CaoVariable class.

#### 3.3.1. CaoController class variable

To register two or more variables (usefulness to change only the option), an arbitrary character string can be given.

The format to give the variable identifier an arbitrary character string is shown below.

#### Two or more variable commonness and specification formats



Variable identifier	Explanation	Value		Reference
		get	put	
@MAKER_NAME	Acquire the manufacturer name.	-	-	P. 14
@VERSION	Acquire the provider version.	-	-	P. 15
@ALARM	Acquire the alarm being being generated now.	-	-	P. 15
@ALARMEX	Acquire the alarm being being generated now (for sub-code character string).	-	-	P. 16
@STATUS	Acquire controller's status.	-	-	P. 16
@BDSP	Display the character string in the pendant.	-	-	P. 17
B<??>	Acquisition/set the value of variable	-	-	P. 17

	(B).			
I<??>	Acquisition/set the value of variable (I).	-	-	P. 18
D<??>	Acquisition/set the value of variable (D).	-	-	P. 19
R<??>	Acquisition/set the value of variable (R).	-	-	P. 20
STR<??>	Acquisition/set the value of S variable (character string).	-	-	P. 21
POS<??>	Acquisition/set the robot positional type variable.	-	-	P. 22
BASEPOS<??>	Acquisition/set a basic variable.	-	-	P. 23
EXTPOS<??>	Acquisition/set the external axis positional type variable.	-	-	P. 24
IO<??>	Read/write I/O.	-	-	P. 26
REG<??>	Read/write the register.	-	-	P. 26
JOBSTATUS<??>	Acquire the job status.	-	-	P. 27
ALARMHIST<??>	Acquire the alarm history.	-	-	P. 28
ALARMHISTEX<??>	Acquire the alarm history (for sub-code character string).	-	-	P. 29
POSITION<??>	Acquire each axis position.	-	-	P. 30
DEVIATION<??>	Acquire each axis positional deflection.	-	-	P. 30
TORQUE<??>	Acquire each shaft torque.	-	-	P. 31
MONITORINGTIME<??>	Acquire the management time.	-	-	P. 32
SYSTEMINFO<??>	Acquire system information.	-	-	P. 33

**3.3.1.1. @MAKER\_NAME**

Acquire the manufacturer name.

**Data type**

Item	Type explanation	
Acquisition	VT_BSTR	Manufacturer name

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
    
```

```

Set var = controller.AddVariable("@MAKER_NAME")
Value ..'.. acquisition
Dim strVal As String
strVal = var.value

```

### 3.3.1.2. @VERSION

Acquire the provider version.

#### Data type

Item	Type explanation	
Acquisition	VT_BSTR	Provider version *. *.*

#### Usage example

```

..'.. connection
Call Connect
Variable ..'.. addition
Dim var As CaoVariable
Set var = controller.AddVariable("@VERSION")
Value ..'.. acquisition
Dim value As String
value = var.value

```

### 3.3.1.3. @ALARM

Acquire the alarm being generated now.

#### Data type

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0-3	VT_VARIANT   VT_ARRAY	Alarm list 1-4
	0	VT_I4	Alarm code
	1	VT_I4	Alarm data
	2	VT_I4	Alarm data type
	3	VT_BSTR	Alarm generation time
	4	VT_BSTR	Alarm character string name

#### Usage example

```

..'.. connection
Call Connect
Variable ..'.. addition
Dim var As CaoVariable
Set var = controller.AddVariable("@ALARM")

```

**Value ..'.. acquisition**

Dim value As Variant

value = var.value

For i = LBound(value) To UBound(value)

MsgBox value(i)

Next

**3.3.1.4. @ALARMEX**

Acquire the alarm being generated now (for sub-code character string).

**Data type**

Item	Type explanation			
Acquisition	VT_VARIANT   VT_ARRAY			
	0-3	VT_VARIANT   VT_ARRAY	Alarm list 1-4	
		0	VT_I4	Alarm code
		1	VT_I4	Alarm data
		2	VT_I4	Alarm data type
		3	VT_BSTR	Alarm generation time
		4	VT_BSTR	Alarm character string name
		5	VT_BSTR	Detailed data addition information character string
		6	VT_BSTR	Detailed data character string
	7	VT_BSTR	Detailed data reversing display information	

**Usage example****..'.. connection**

Call Connect

**Variable ..'.. addition**

Dim var As CaoVariable

Set var = controller.AddVariable("@ALARMEX")

**Value ..'.. acquisition**

Dim value As Variant

value = var.value

For i = LBound(value) To UBound(value)

MsgBox value(i)

Next

**3.3.1.5. @STATUS**

Acquire controller's status.

**Data type**

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0	VT_I4	Status data 1
	1	VT_I4	Status data 2

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("@STATUS")
Value ... acquisition
Dim value As Integer
value = var.value
    
```

**3.3.1.6. @BDSP**

Display the character string in the pendant.

**Data type**

Item	Type explanation	
Setting	VT_BSTR	Character string to want to display

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("@BDSP")
Value ... setting
var.value = ("abc")
    
```

**3.3.1.7. B<??>**

Acquisition/set the value of variable (B).

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	2~2147483647 - 2	--

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetVarDataMB and

ESSetVarDataMB" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

- 2 API is limited and make the number the even number piece.

#### Data type

Item	Type explanation		
Acquisition/setting	VT_UI1   VT_ARRAY		
	n	VT_UI1	Value of variable (B)

#### Usage example

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("B1", "NO=1, ELEM=2")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    value(i) = value(i) + (i + 1)
Next
var.value = value

```

### 3.3.1.8. I<??>

Acquisition/set the value of variable (I).

#### Option

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetVarDataMI and ESSetVarDataMI" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

**Data type**

Item	Type explanation	
Acquisition/setting	VT_I2   VT_ARRAY	
	n	VT_I2   Value of variable (I)

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("I1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    value(i) = value(i) + (i + 1)
Next
var.value = value
    
```

**3.3.1.9. D<??>**

Acquisition/set the value of variable (D).

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetVarDataMD and ESSetVarDataMD" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

**Data type**

Item	Type explanation
------	------------------

Acquisition/setting	VT_I4   VT_ARRAY	
	n	VT_I4   Value of variable (D)

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("D1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    value(i) = value(i) + (i + 1)
Next
value = var.value
    
```

**3.3.1.10. R<??>**

Acquisition/set the value of variable (R).

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetVarDataMR and ESSetVarDataMR" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

**Data type**

Item	Type explanation	
Acquisition/setting	VT_R8   VT_ARRAY	
	n	VT_R8   Value of variable (R)

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("R1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    value(i) = value(i) + (i + 1)
Next
value = var.value

```

**3.3.1.11. STR<??>**

Acquisition/set the value of S variable (character string).

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetStrDataM, ESSetStrDataM, ESGetStrDataM2, and ESSetStrDataM2" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

**Data type**

Item	Type explanation
Acquisition/setting	VT_BSTR   VT_ARRAY
	n   VT_BSTR   Value of S variable (character string)

**Usage example**

```

... connection
Call Connect
Variable ... addition

```

```

Dim var As CaoVariable
Set var = controller.AddVariable("STR1", "NO=1, ELEM=3")
Value ..'.. acquisition
Dim value As Variant
value = var.value
Value ..'.. setting
Dim value As Variant
For i = LBound(value) To UBound(value)
    value(i) = value(i) + CStr(i + 1)
Next
value = var.value

```

### 3.3.1.12. POS<??>

Acquisition/set the robot positional type variable.

#### Option

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetPositionDataM and ESSetPositionDataM" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

#### Data type

Item	Type explanation		
Acquisition/ setting	VT_VARIANT   VT_ARRAY		
	n	VT_VARIANT   VT_ARRAY	Data of n piece
	0	VT_I4	Data type (pulse value/orthogonalization value)
	1	VT_I4	Form
	2	VT_I4	Tool number
	3	VT_I4	User coordinates number
	4	VT_I4	Enhancing form
5	VT_R8	Axis data 1	

	6	VT_R8	Axis data 2
	7	VT_R8	Axis data 3
	8	VT_R8	Axis data 4
	9	VT_R8	Axis data 5
	10	VT_R8	Axis data 6
	11	VT_R8	Axis data 7
	12	VT_R8	Axis data 8

#### Usage example

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("POS1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
  For j = LBound(value(i)) To UBound(value(i))
    value(i)(j) = value(i)(j) + (j + 1)
  Next
Next
Next
value = var.value

```

### 3.3.1.13. BASEPOS<??>

Acquisition/set a basic variable.

#### Option

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--
Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetBpexPositionDataM and ESSetBpexPositionDataM" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

**Data type**

Item	Type explanation		
Acquisition/ setting	VT_VARIANT   VT_ARRAY		
	n	VT_VARIANT   VT_ARRAY	Data of n piece
	0	VT_I4	Data type (pulse value/orthogonalization value)
	1	VT_R8	Axis data 1
	2	VT_R8	Axis data 2
	3	VT_R8	Axis data 3
	4	VT_R8	Axis data 4
	5	VT_R8	Axis data 5
	6	VT_R8	Axis data 6
	7	VT_R8	Axis data 7
8	VT_R8	Axis data 8	

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("BASEPOS1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    For j = LBound(value(i)) To UBound(value(i))
        value(i)(j) = value(i)(j) + (j + 1)
    Next
Next
Next
value = var.value
    
```

**3.3.1.14. EXTPOS<??>**

Acquisition/set the external axis positional type variable.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Variable number	0~2147483647 - 1	--

Elem	-	Number from specified variable number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESGetBpexPositionDataM and ESSetBpexPositionDataM" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

#### Data type

Item	Type explanation		
Acquisition/setting	VT_VARIANT   VT_ARRAY		
	n	VT_VARIANT   VT_ARRAY	Data of n piece
	0	VT_I4	Data type (pulse value/orthogonalization value)
	1	VT_R8	Axis data 1
	2	VT_R8	Axis data 2
	3	VT_R8	Axis data 3
	4	VT_R8	Axis data 4
	5	VT_R8	Axis data 5
	6	VT_R8	Axis data 6
	7	VT_R8	Axis data 7
8	VT_R8	Axis data 8	

#### Usage example

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("EXTPOS1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    For j = LBound(value(i)) To UBound(value(i))
        value(i)(j) = value(i)(j) + (j + 1)
    Next
Next
Next
value = var.value

```

**3.3.1.15. IO<??>**

Read/write I/O.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	–	I/O address	0~2147483647 – 1	--
Elem	–	Number from specified I/O address	2~2147483647 – 2	--

- 1 Refer to “5.2 robot control function ESReadIOM and ESWriteIOM” of the MOTOCOMES manual.
- 2 API is limited and make the number the even number piece.

**Data type**

Item	Type explanation
Acquisition/setting	VT_UI1   VT_ARRAY
	n   VT_UI1   Value of I/O

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("I01", "NO=1, ELEM=2")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    value(i) = value(i) + (i + 1)
Next
value = var.value

```

**3.3.1.16. REG<??>**

Read/write the register.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	–	Register number	0~2147483647	--

			- 1	
Elem	-	Number from specified register number	1~2147483647	--
Array	--	When one is specified for a number, it is a flag whether arrange it.	True: Do. False:	False

- 1 Confirm RS022 of YRC by referring to "5.2 robot control function ESReadRegisterM and ESWriteRegisterM" of the MOTOCOMES manual. It is necessary to do +1 to the variable number for RS022=0.

**Data type**

Item	Type explanation		
Acquisition/setting	VT_I2   VT_ARRAY		
	n	VT_I2	Value of register

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("REG1", "NO=1, ELEM=3")
Value ... acquisition
Dim value As Variant
value = var.value
Value ... setting
For i = LBound(value) To UBound(value)
    value(i) = value(i) + (i + 1)
Next
value = var.value
    
```

**3.3.1.17. JOBSTATUS<??>**

Acquire the job status.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Task number	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetJobStatus" of the MOTOCOMES manual.

**Data type**

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0	VT_BSTR	Job name
	1	VT_I4	Line number
	2	VT_I4	Step number
	3	VT_I4	Speed override value

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("JOBSTATUS1", "NO=1")
Value ... acquisition
Dim value As Variant
value = var.value

```

**3.3.1.18. ALARMHIST<??>**

Acquire the alarm history.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Alarm number	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetAlarmHist" of the MOTOCOMES manual.

**Data type**

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0	VT_I4	Alarm code
	1	VT_I4	Alarm data
	2	VT_I4	Alarm data type
	3	VT_BSTR	Alarm generation time
	4	VT_BSTR	Alarm character string name

**Usage example**

```

... connection

```

---

```

Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("ALARMHIST1", "NO=1")
Value ... acquisition
Dim value As Variant
value = var.value

```

---

### 3.3.1.19. ALARMHISTEX<??>

Acquire the alarm history (for sub-code character string).

#### Option

Option	Indispensability	Explanation	Range of value	Default value
No	-	Alarm number	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetAlarmHistEx" of the MOTOCOMES manual.

#### Data type

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0	VT_I4	Alarm code
	1	VT_I4	Alarm data
	2	VT_I4	Alarm data type
	3	VT_BSTR	Alarm generation time
	4	VT_BSTR	Alarm character string name
	5	VT_BSTR	Detailed data addition information character string
	6	VT_BSTR	Detailed data character string
7	VT_BSTR	Detailed data reversing display information	

#### Usage example

---

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("ALARMHISTEX1", "NO=1")
Value ... acquisition
Dim value As Variant
value = var.value

```

---

**3.3.1.20. POSITION<??>**

Acquire each axis position.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Control group	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetPosition" of the MOTOCOMES manual.

**Data type**

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0	VT_I4	Data type (pulse value/orthogonalization value)
	1	VT_I4	Form
	2	VT_I4	Tool number
	3	VT_I4	User coordinates number
	4	VT_I4	Enhancing form
	5	VT_R8	Axis data 1
	6	VT_R8	Axis data 2
	7	VT_R8	Axis data 3
	8	VT_R8	Axis data 4
	9	VT_R8	Axis data 5
	10	VT_R8	Axis data 6
	11	VT_R8	Axis data 7
12	VT_R8	Axis data 8	

**Usage example**

```

..'.. connection
Call Connect
Variable ..'.. addition
Dim var As CaoVariable
Set var = controller.AddVariable("POSITION1", "NO=1")
Value ..'.. acquisition
Dim value As Variant
value = var.value

```

**3.3.1.21. DEVIATION<??>**

Acquire each axis positional deflection.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Control group	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetDeviation" of the MOTOCOMES manual.

**Data type**

Item	Type explanation		
Acquisition	VT_R8   VT_ARRAY		
	0	VT_R8	Axis data 1
	1	VT_R8	Axis data 2
	2	VT_R8	Axis data 3
	3	VT_R8	Axis data 4
	4	VT_R8	Axis data 5
	5	VT_R8	Axis data 6
	6	VT_R8	Axis data 7
	7	VT_R8	Axis data 8

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("DEVIATION1", "NO=1")
Value ... acquisition
Dim value As Variant
value = var.value

```

**3.3.1.22. TORQUE<??>**

Acquire each shaft torque.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
No	-	Control group	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetTorque" of the MOTOCOMES manual.

**Data type**

Item	Type explanation		
Acquisition	VT_R8   VT_ARRAY		
	0	VT_R8	Axis data 1
	1	VT_R8	Axis data 2
	2	VT_R8	Axis data 3
	3	VT_R8	Axis data 4
	4	VT_R8	Axis data 5
	5	VT_R8	Axis data 6
	6	VT_R8	Axis data 7
	7	VT_R8	Axis data 8

**Usage example**

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("TORQUE1", "NO=1")
Value ... acquisition
Dim value As Variant
value = var.value
    
```

**3.3.1.23. MONITORINGTIME<??>**

Acquire the management time.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
Type	-	Type at management time	0~2147483647 - 1	---

- 1 Refer to "5.2 robot control function ESGetMonitoringTime" of the MOTOCOMES manual.

The type at the management time excerpted from the MOTOCOMES manual is shown as follows.

Value	Explanation
1	Control power supply turning on time
10	Servo power supply turning on time (TOTAL)
11~18	Servo power supply turning on time

	(R1-R8)
21~44	Servo power supply turning on time (S1-S24)
110	Playback time (TOTAL)
111~118	Playback time (R1-R8)
121~144	Playback time (S1-S24)
210	Travel time (TOTAL)
211~218	Travel time (R1-R8)
221~244	Travel time (S1-S24)
301~308	Working hours (. . usage . . one-usage 8)

**Data type**

Item	Type explanation		
Acquisition value	VT_BSTR   VT_ARRAY		
	0	VT_BSTR	Operation beginning time
	1	VT_BSTR	Elapsed time

**Usage example**

```

..'. connection
Call Connect
Variable ..'. addition
Dim var As CaoVariable
Set var = controller.AddVariable("MONITORINGTIME1", "TYPE=1 ")
Value ..'. acquisition
Dim value As Variant
value = var.value

```

**3.3.1.24. SYSTEMINFO<??>**

Acquire system information.

**Option**

Option	Indispensability	Explanation	Range of value	Default value
Type	-	Type of system information	0~2147483647 - 1	--

- 1 Refer to "5.2 robot control function ESGetSystemInfo" of the MOTOCOMES manual.

The type of system information excerpted from the MOTOCOMES manual is shown as follows.

Value	Explanation
11~18	Model information (R1-R8)
21~44	Model information (S1-S24)
101~108	Usage information (R1-R8)

#### Data type

Item	Type explanation		
Acquisition	VT_VARIANT   VT_ARRAY		
	0	VT_BSTR	System software version
	1	VT_BSTR	Model name/usage name
	2	VT_BSTR	Parameter No.

#### Usage example

```

... connection
Call Connect
Variable ... addition
Dim var As CaoVariable
Set var = controller.AddVariable("SYSTEMINF01", "TYPE=11")
Value ... acquisition
Dim value As Variant
value = var.value

```

## 4. Programming by YASKAWA MOTOCOMES provider

In the YASKAWA MOTOCOMES provider, client PC and YRC can be connected according to the following procedures.

- Making of CaoEngine
- Making of CaoWorkspace
- Making of CaoController

After it connects it with YRC, it can access information on YRC by generating the CaoVariable object.

### 4.1. Sample programming that acquires, and sets value of variable (I)

The sample program that acquires, and sets the value of variable (I) as an example is shown here. Table4-1The requirement for [ni] sample programFigure4-1The flow of [ni] sample program is described respectively.

Table4-1Requirement for sample program

Requirement	Explanation
Connection destination	Connection destination Internet Protocol address is 192.168.10.10.
	The connection destination robot control type is one.
Content processing of	Acquire the value of variable (I) of variable number 10.
	Value in which the value of variable (I) of variable number 10 is acquired + Set it to the value of 100.

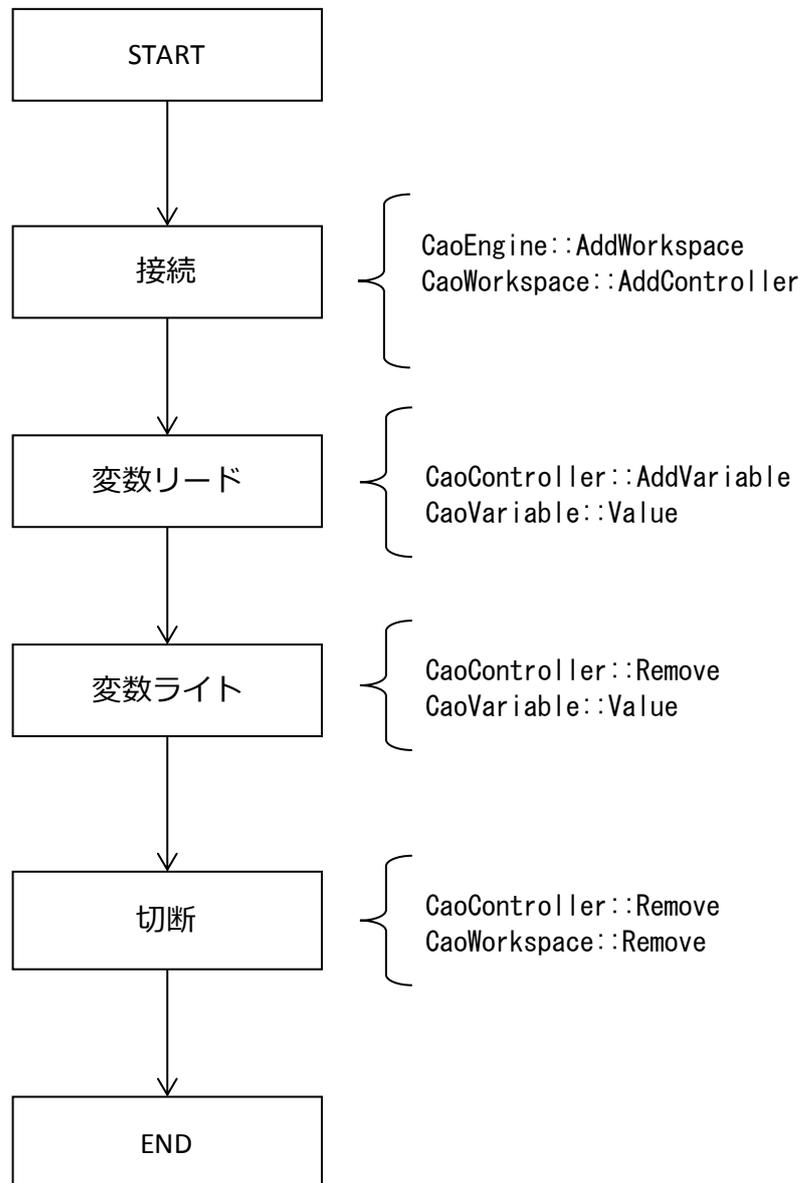


Figure4-1It is a flow of acquisition/setting in the value of variable (I).  
A concrete code is shown from the following paragraphs.

#### 4.1.1. Sample program

The whole image of the sample program is shown as follows.

Sample	GetSetIntegerVariable.vb
<pre> ... object Dim engine As CaoEngine Dim workspace As CaoWorkspace Dim controller As CaoController </pre>	

```

Private Sub Main()
    ... connection
    Call Connect

    Add 'CaoVariable accessed variable number 10 to CaoController.
    Dim intVarI10 As CaoVariable
    set intVarI10 = controller.AddVariable("I-10", "no=10, elem=1")

    Acquire the value from 'variable number 10.
    Dim value As Integer
    value = intVar_10.value

    'Acquired value + to variable number 10 Set the value of 100.
    intVar_10.value = value + 100

    ... delete CaoVariable from CaoController.
    Call controller.Variables.Remove(intVar_10.Index)
    ... deletion of CaoVariable
    Set intVar_10 = Nothing

    ... cutting
    Call Dicconnect
End Sub

Connection ... method
Private Sub Connect()
    ... generation of CaoEngine object
    Set engine = New CaoEngine
    ... generation of CaoWorkspace object
    Set workspace = engine.AddWorkspace("NewWrks", "")
    ... generation of CaoController object
    Set controller = workspace.AddController("Controller", _
                                           "CaoProv.YASKAWA.MOTOCOMES", _
                                           "", _
                                           "conn=eth:192.168.10.10, cntltype=1")
End Sub

Cutting ... method
Private Sub Disconnect()
    ... delete CaoController from CaoWorkspace.
    Call workspace.Controllers.Remove(controller.Index)
    ... deletion of CaoController
    Set controller = Nothing

    ... delete CaoWorkspace from CaoEngine.
    Call engine.Workspaces.Remove(workspace.Index)
    ... deletion of CaoWorkspace

```

```

Set workspace = Nothing

... deletion of CaoEngine
Set engine = Nothing
End Sub

```

---

#### 4.1.1.1. Connection

Take the following procedures to connect it with YRC.

- (1) Prepare the variable to maintain the object. The object necessary for the controller connection is CaoEngine object, CaoWorkspace object, and CaoController object. When the CaoController object is acquired from CaoWorkspaces, the CaoWorkspace object need not prepare the variable. Moreover, the CaoVariable object to access the variable is needed. The example of the code in VB6 is shown as follows.

```

Dim engine As CaoEngine      ... variable for CaoEngine object
Dim workspace As CaoWorkspace ... variable for CaoWorkspace object
Dim controller As CaoController ... variable for CaoController object

```

---

- (2) Generate the CaoEngine object. The CaoEngine object uses and generates the New key word.

```

... generation of CaoEngine object
Set engine = New CaoEngine

```

---

- (3) Acquire the CaoWorkspace object or generate it. When the CaoEngine object is generated, the CaoWorkspaces object and the CaoWorkspace object are generated with default one by one. The example of the code of newly generating the CaoWorkspace object and CaoWorkspace of default are shown as follows.

```

... generation of CaoWorkspace object
Set workspace = engine.AddWorkspace("NewWrks", "")

```

---

- (4) Generate the CaoController object. Set the CaoController object and set the provider name used and the parameter to use it to generate it. In the YASKAWA MOTOCOMES provider, specify Internet Protocol address and the robot control type of the connection destination in the option. The example of the code is shown as follows.

```

... generation of CaoController object
Set controller = workspace.AddController("Controller ", _
                                         "CaoProv. YASKAWA. MOTOCOMES", _
                                         "", _
                                         "conn=eth:192.168.10.10, cntltype=1")

```

---

#### 4.1.1.2. Acquisition/setting of variable

Generate the CaoVariable object of the variable to be accessed acquisition/to set the value of the variable, and reference/set the Value property of the CaoVariable object. When the Value property reference/is set, it is necessary to prepare the type variable matched to the Value property. The example of the code is shown as follows.

---

```
Add 'CaoVariable' accessed variable number 10 to CaoController.
Dim intVar_10 As CaoVariable
Set intVar_10 = controller.AddVariable("I-10", "no=10, elem=1")

Acquire the value from 'variable number 10.
Dim value As Integer
value = intVar_10.value

'Acquired value + to variable number 10 Set the value of 100.
intVar_10.value = value + 100

...'.. delete CaoVariable from CaoController.
Call controller.Variables.Remove(intVar_10.Index)
...'.. deletion of CaoVariable
Set intVar_10 = Nothing
```

---

#### 4.1.1.3. Cutting

Delete the generated object, and delete the object deleted from the collection class that manages the object when cutting it with the controller. The example of the code is shown as follows.

---

```
'..'.. delete CaoController from CaoWorkspace.
Call workspace.Controllers.Remove(controller.Index)
...'.. deletion of CaoController
Set controller = Nothing
...'.. delete CaoWorkspace from CaoEngine.
Call engine.Workspaces.Remove(workspace.Index)
...'.. deletion of CaoWorkspace
Set workspace = Nothing
...'.. deletion of CaoEngine
Set engine = Nothing
```

---

## 5. MOTOCOMES provider error code

In this provider, the following original error codes in which the mask is done with 0x8011\*\*\*\* exist. (Table5-1Reference)

About a common error of ORiN2, "[ORiN2 プログラミングガイド](#) Refer to the chapter of the error code of".

Table5-10original error code table

Error number	Explanation
0x80110001	There is no controller optional type.

Moreover, this provider does the mask by "0x8010\*\*\*\*" and returns the error code of API. Refer to the MOTOCOMES manual for a detailed error code of API.

## Appendix A. Table for API

This..variable..acquisition..set..use..API..as follows..show.

Variable identifier	Use API when acquiring it	Use API when setting it
@ALARM	ESGetAlarm	–
@ALARMEX	ESGetAlarmEx	–
@STATUS	ESGetStatus	–
@BDSP	–	ESBDSP
B<??>	ESGetVarDataMB	ESSetVarDataMB
I<??>	ESGetVarDataMI	ESSetVarDataMI
D<??>	ESGetVarDataMD	ESSetVarDataMD
R<??>	ESGetVarDataMR	ESSetVarDataMR
STR<??>	<ul style="list-style-type: none"> <li>– CntlType=1</li> <li>– CntlType=2</li> <li>When the above-mentioned is specified, it is ESGetStrDataM.</li> <li>– CntlType=3</li> <li>– CntlType=4</li> <li>– CntlType=5</li> <li>When the above-mentioned is specified, it is ESGetStrDataM2.</li> </ul>	<ul style="list-style-type: none"> <li>– CntlType=1</li> <li>– CntlType=2</li> <li>When the above-mentioned is specified, it is ESSetStrDataM.</li> <li>– CntlType=3</li> <li>– CntlType=4</li> <li>– CntlType=5</li> <li>When the above-mentioned is specified, it is ESSetStrDataM2.</li> </ul>
POS<??>	ESGetPositionDataM	ESSetPositionDataM
BASEPOS<??>	ESGetBpexPositionDataM	ESSetBpexPositionDataM
EXTPOS<??>	ESGetBpexPositionDataM	ESSetBpexPositionDataM
IO<??>	ESReadIOM	ESWriteIOM
REG<??>	ESReadRegisterM	ESWriteRegisterM
JOBSTATUS<??>	ESGetJobStatus	–
ALARMHIST<??>	ESGetAlarmHist	–
ALARMHISTEX<??>	ESGetAlarmHistEx	–
POSITION<??>	ESGetPosition	–
DEVIATION<??>	ESGetDeviation	–
TORQUE<??>	ESGetTorque	–
MONITORINGTIME<??>	ESGetMonitoringTime	–
SYSTEMINFO<??>	ESGetSystemInfo	–