Japan Steel Works, Ltd.
J-ADS provider

Version 1.0.1

User's guide

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Remarks:

This document is translated into English using machine translation.

【 revision history 】

Version	Date	Content
1.0.0	2019-06-12	First edition.
1.0.1	2019-08-20	Change in Controller class variable and addition of RawCommand command
	2022-12-27	Adding Annotations to ReadLGData1 Command

【Operation check model】

Model	Version	Notes
SYSCOM5000i	-	

Contents

1. Introduction

This book is an user's guide of the ORiN provider of electric injection molding made by The Japan Steel Works (henceforth JSW) company machine device J-AD S Series (JSW J-ADS provider). Electric injection molding made by JSW company machine J-ADS uses the Ethernet communication and this provider acquires data. Figure1-1However, it becomes a whole of device block diagram with [hon] provider. This provider is named JSW J-ADS provider later.

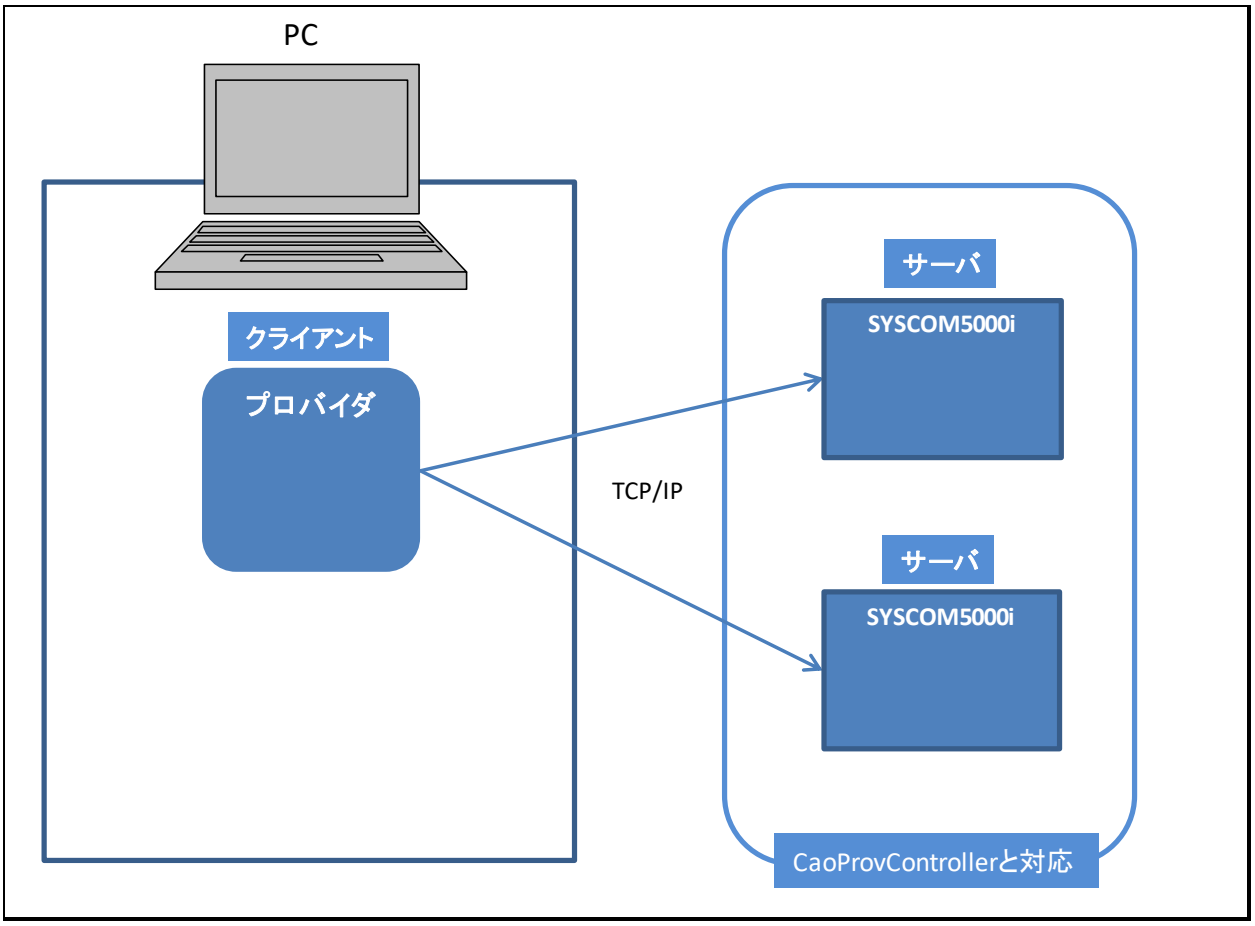


Figure1-1Block diagram

Moreover, this provider and correspondence each deviceFigure1-2[Ni] is shown.
(* It is one example. It is not because everything is shown.)

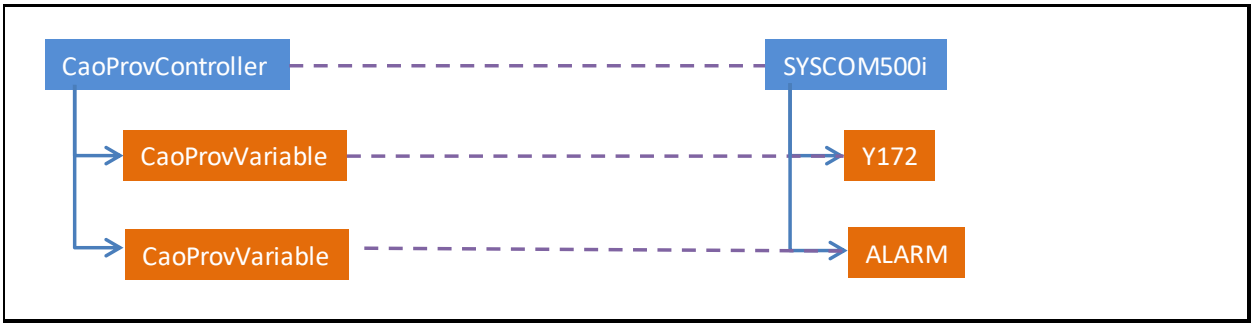


Figure1-2Composition of provider and correspondence chart with device information

2. Environmental setup for application development

2.1. Connection of SYSCOM5000i and client PC

The JSW J-ADS provider connects it with SYSCOM5000i by using the TCP/IP communication of the Ethernet communication.

Set the setting of Internet Protocol address etc. of SYSCOM5000i on the screen in Figure 2-1.

Figure2-1Set screen of SYSCOM5000i

Internet Protocol address of PC of being possible to connect it with Internet Protocol address set by the above-mentioned can be set, and be the connection with the equipment.

2.2. Setup of PC development setting

2.2.1. Installation of JSW J-ADS provider

The JSW J-ADS provider is automatically set up with the installer of ORiN2 SDK. Moreover, when the JSW J-ADS provider is installed by hand power, it is necessary to register the following registry. Start the command prompt by the manager authority, and execute the regsvr32 command when you register the registry.

Moreover, if one regular ORiN2 SDK license of each PC is not registered beforehand so that the CAO engine may work, it doesn't become it. Refer to the paragraph of "Addition and deletion of the license" in the ORiN2 SDK user's guide.

Table2-1JSW J-ADS provider

File name	CaoProvJSWJ-ADS.dll
ProgID	CaoProv.JSW.J-ADS
Registry registration	regsvr32 CaoProvJSWJ-ADS.dll
Blotting out of registry registration	regsvr32 /u CaoProvJSWJ-ADS.dll

3. Command reference

3.1. Method/property list

Table3-1Method/property list

Category	[1]Method/property		Function	Reference
CaoWorkspace				
	AddController	M	Connect it with the controller.	P. 9
CaoController				
	VariableNames	P	Acquisition of variable identifier list that can be connected	P. 11
	Variables	P	Acquisition of variable collection that controller maintains	P. 11
	AddVariable	M	Addition of variable object	P. 11
	Execute	M	Execution of enhancing command	P. 11
CaoVariable				
	Value	P	Acquisition of value	P. 15

3.2. Method property

3.2.1. CaoWorkspace class

3.2.1.1. AddController method

Add the controller object to CaoWorkspace. In the JSW J-ADS provider, connect it with corresponding SYSCOM5000i referring to the parameter passed when the AddController method is executed. The specification of the AddController method is shown as follows.

Format

AddController

```
(
        "< controller name >"          // Controller name (arbitrariness)
        "CaoProv.JSW.J-ADS",           // Provider name (fixation)
        "< machine name >"             // Provider execution machine name
        "< option >"                   // Optional character string
)
```

[1] M:メソッド, P:プロパティ, E:イベントをそれぞれ示します.

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 by comma (,).

Option	Indispensability	Explanation	Range of value	Default value
Conn=	-	Option (ETH) for connection	-----	Please refer to chapter 3.2.1.1.1 for details.
Timeout	--	Response standby time (ms)	1 - 30000	500

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("J-ADS",_
                                          "CaoProv.JSW.J-ADS",_
                                          "",_
                                          "Coon = ETH:192.168.0.1,Timeout = 1000")
```

3.2.1.1.1. Conn is optional.

Connection destination port of :< > :< local IP > :< local port Conn = ETH:< connection destination IP >

< connection destination IP > : It is *** as for connection destination Internet Protocol address . *** . *** . Specify it in the form of ***.

< connection destination port >: Specify the connection destination port number.

Default: 55553 For -> two or more clients

55554 Port only for -> variable operation

< local IP > : It is *** as for Internet Protocol address on the PC side . *** . *** . Specify it in the form of ***.

Default:Unspecification

{< local port > }: The port number on the PC side is done and it presents it.

Default:Unspecification

3.2.2. CaoController class

3.2.2.1. VariableNames property

Get a list of connectable variable names. The variable name can be used as the first argument of the AddVariable method. Usage example

```
' connection
Call Connect

Variable identifier list ..'.. acquisition
Dim variables as Variant
variables = controller.VariableNames
```

3.2.2.2. Variables property

Acquire the variable collection that the controller maintains.

Usage example

```
' connection
Call Connect

' Variable collection acquisition
Dim variables as CaoVariables
Set variables = controller.Variables

' Variable acquisition
Dim variable as CaoVariable
Set variable = variables.Item(0)
```

3.2.2.3. AddVariable method

Add the variable object to CaoController. The variables that can be used are shown in Section 3.3.1.

The specification of AddVariable is shown as follows.

Format

AddVariable

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

3.2.2.4. Execute method

Execute the enhancing command of ConController. The specification of Execute is shown as follows.

Format

Execute

(

"< enhancing command name >" // Enhancing command name

"< optional character string >" // Optional character string (It is possible to omit it).

)

The enhancing command list that can be specified with Execute is shown as follows. The enhancing command is detailed and the usage example is described.

Command	Explanation	Reference
ReadStatus	Acquire the value of the specified variable.	P. 12
ReadLGDATA1	Acquire the latest measurements log data.	P. 13
ReadAlarmLog	Acquire a present alarm.	P. 14
RawCommand	Transmit the specified arbitrary data as it is, and exchange it with the equipment.	P. 14

3.2.2.4.1. ReadStatus command

Specify the variable, and acquire the value of the specified variable. The argument and the return value are shown as follows. However, when the specified variable doesn't exist, "?" is acquired as for a part alone that doesn't exist.

Item	Type explanation		
Argument	VT_ARRAY | VT_BSTR		
	i	VT_BSTR	Specify the specified variable identifier. The variable that can be specifiedTable3-2 と Table3-3Refer to [wogo].
Return value	VT_ARRAY | VT_BSTR		
	i	VT_BSTR	The value of the specified variable is returned.

- I: Number of specified variables

Table3-2Variable list that shows machine status

Variable identifier	Outline	Remarks
Y172	State of machine (manual mode of operation)	One or 0 (manual inside))(in no manual operation it

Y175	State of machine (automatic operation and semiautomatic mode)	One or 0 (automatic operation and semiautomatic inside)(It not semiautomatic no automatic operation).
Y178	State of machine (Be stopping).	One or 0 (Be stopping)(Be not stopping).
Y179	State of machine (Be stopping).	One or 0 (Be stopping)(Be not stopping).
ALARM	Sequencer (alarm inside)	One or 0 (There is an alarm)(the alarm none).

Table3-3Variable list that shows attainment at check time

Variable identifier	Outline	Remarks
INSM1NG	Check for one month	One or 0 (attainment at check time)
INSM3NG	Check for three months	One or 0 (attainment at check time)
INSM6NG	Check for six months	One or 0 (attainment at check time)
INSY1NG	Check for one year	One or 0 (attainment at check time)

Usage example

```
' connection
Call Connect

' Argument initialization
Dim param(1) As String
param(0) = "Y172"
param(1) = "ALARM"

 ' ReadStatus execution
Dim val() As String
val = controller.Execute("ReadStatus",param)
```

3.2.2.4.2. ReadLGDATA1 command

Acquire final one record of the measurements log. The argument and the return value are shown as follows.

Item	Data type	Type explanation
Argument	None	

Item	Data type	Type explanation
Return value	VT_ARRAY | VT_BSTR	The array of which the element is final one record of the measurements log is stored. [2]

Usage example

```
' connection
Call Connect

' ReadMesurementLog execution
Dim val As Variant
val = controller.Execute("ReadLGDATA1", "")
```

3.2.2.4.3. ReadAlarmLog command

Acquire alarm information on the unrelease. The argument and the return value are shown as follows.

Item	Type explanation	
Argument	None	
Return value	VT_ARRAY | VT_BSTR or VT_EMPTY	Unrelease alarm information is stored in the array. It becomes VT_EMPTY when there is no unrelease alarm.

Usage example

```
' connection
Call Connect

' ReadAlarmLog execution
Dim val As Variant
val = controller.Execute("ReadAlarmLog", "")
```

3.2.2.4.4. RawCommand command

Transmit the character string specified by the argument to the equipment as it is, and acquire data from the equipment as it is. The argument and the return value are shown as follows.

Item	Type explanation	
Argument	VT_BSTR	Specify the character string transmitted to the equipment arbitrarily.
Return value	VT_BSTR	Acquire data from the equipment as it is.

※ When an uncertain command is specified for the argument, the return value is acquired

[2] The details of each element in the record vary from machine to machine. Contact the manufacturer.

as follows.

Return value	VT_BSTR	UNKNOWN ****

- The character string specified by the argument is inserted in ･***.

Usage example

```
' connection
Call Connect

' RawCommand ..'.. execution
Dim val As String
val = controller.Execute("RawCommand", "VGET Y172")
```

3.2.3. CaoVariable class

3.2.3.1. Value property

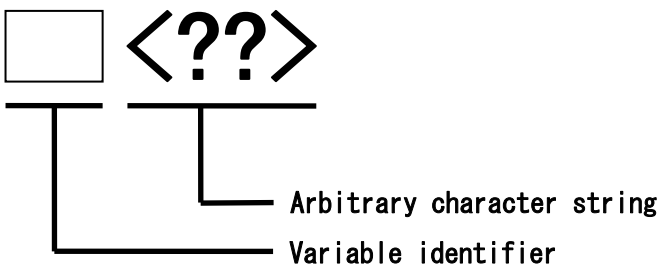
Acquire data from connected SYSCOM5000i. Please refer to chapter 3.3 for details.

3.3. Variable list

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



3.3.1. CaoController class variable

Variable identifier	Explanation	Value		Reference
		get	put	
@MAKER_NAME	Acquire the manufacturer name.	○	-	P.16

@VERSION	Acquire the DLL version.	○	-	P.16
@LGDATA1	Acquire the latest measurements log.	○	-	P.17
@ALARM_LOG	Acquire the alarm of the unrelease.	○	-	P.17
STATUS<??>	Acquire the value of the variable.	○	-	P.17

3.3.1.1. @MAKER_NAME

Acquire the manufacturer name.

Data type

Type explanation	
VT_BSTR	Acquire the 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 version of DLL.

Data type

Type explanation	
VT_BSTR	Acquire the version of DLL. *.*.*

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. @LGDATA1

Acquire final one record of the measurements log.

Data type

Type explanation	
VT_ARRAY | VT_BSTR	Data similar to the return value of the ReadLGDATA1 command is returned.

Usage example

```
' connection
Call Connect
Variable ..'.. addition
Dim varLGDATA1 As CaoVariable
Set varLGDATA1 = controller.AddVariable("@LGDATA1")

Value ..'.. acquisition
Dim logValues() As String
logValues = varLGDATA1.value
```

3.3.1.4. @ALARM_LOG

Acquire alarm information on the unrelease.

Data type

Type explanation	
VT_ARRAY | VT_BSTR or VT_EMPTY	Data similar to the return value of the ReadAlarmlog command is returned.

Usage example

```
' connection
Call Connect

Variable ..'.. addition
Dim varAlarmLog As CaoVariable
Set varAlarmLog = controller.AddVariable("@ALARM_LOG")

Value ..'.. acquisition
Dim logValues() As String
logValues = varAlarmLog.value
```

3.3.1.5. STATUS<??>

Acquire the value of the variable specified in as follows and the option. Input an arbitrary character string after "STATUS" and specify the variable identifier. The option specified by

an optional character string is shown as follows.

Option

Option	Indispensability	Explanation	Range of value	Default value
Target=	–	Specify the variable identifier to be acquired. Specify the variable identifier by switching off the comma district. Enclose the value of the option with either of the following parentheses. "()","{}","[]","<>"	-----	–

Data type

Type explanation	
VT_ARRAY | VT_BSTR	It drinks and data similar to the return value is returned.

Usage example

```
' connection
Call Connect
Variable ..'.. addition
Dim varStatus As CaoVariable
Set varStatus = controller.AddVariable("STATUS_1", "Target=<Y172, ALARM>")
Value ..'.. acquisition
Dim value() As String
value = varStatus.value
```

4. Programming by JSW J-ADS provider

In the jSW J-ADS provider, client PC and SYSCOM5000i can be connected according to the following procedures.

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

After it connects it with SYSCOM5000i, it can access information on SYSCOM5000i by using the Execute method of CaoController or generating the CaoVariabe object.

4.1. Sample programming to acquire value of machine status

The sample program that reads the value of the machine status as the 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	Connect it by TCP/IP.
	Connection destination Internet Protocol address is 192.168.1.2.
	The connection destination port number is 55553.

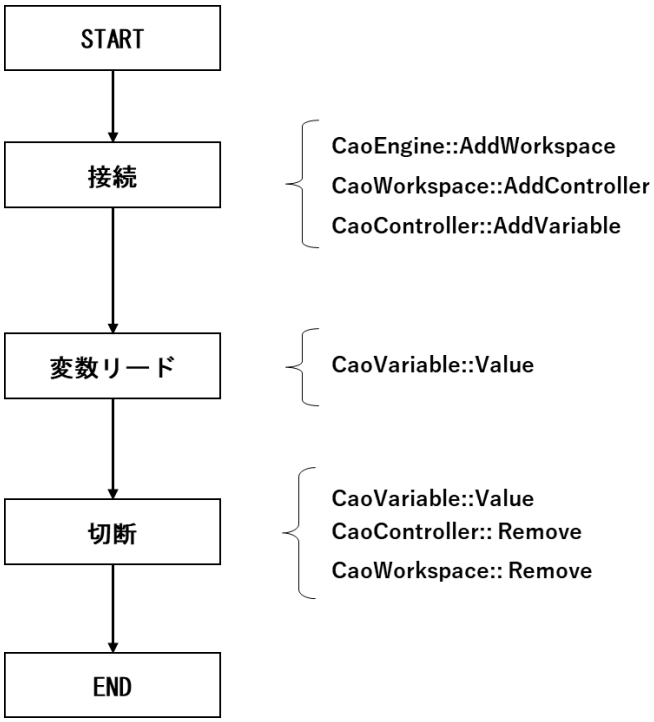


Figure4-1It is a flow in the value of the variable that shows the machine status ..acquisition...

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	ReadStatus.vb

```
Variable ..'.. declaration
Private engine As CaoEngine
Private workspace As CaoWorkspace
Private controller As CaoController

Connection ..'.. method
Private Sub Connect()
 ..'.. generation of CaoEngine object
 Set engine = New CaoEngine
Acquisition of 'CaoWorkspace of default object
 Set workspace = engine.Workspaces.Item(0)

 ..'.. making of CaoController object
 Set controller = workspace.AddController("J-ADS", _
 "CaoProv.JSW.J-ADS", _
```

```
 "", _
 "conn = ETH:192.168.1.2")
End Sub
Cutting ..'.. method
Private Sub Disconnect()
 workspace.Controllers.Remove (controller.Index)
 ..'.. deletion of CaoController
 Set controller = Nothing
 Call engine.Workspaces.Remove(workspace.Index)
 ..'.. deletion of CaoWorkspace
 Set workspace = Nothing
 ..'.. deletion of CaoEngine
 Set engine = Nothing
End Sub

Sub Main()
' connection
 Call Connect

Variable ..'.. addition
 Dim varStatus As CaoVariable
 ..'.. generation of CaoVariable object
 Set varStatus = controller.AddVariable("STATUS_1", "Target=<Y172, ALARM>")

Value ..'.. acquisition
 Dim statusValues() As String
 statusValues = varStatus.value

Return ..'.. value 1
 Dim varY172 As String
 varY172 = statusValues(0)

Return ..'.. value 2
 Dim varALARM As String
 varALARM = statusValues(1)

 Call controller.Variables.Remove(varStatus.Index)
```

```
 Set varStatus = Nothing

..'.. cutting
 Call Disconnect

End Sub
```

4.1.1.1. Connection

Take the following procedures to connect it with SYSCOM5000i.

(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 CaoWorkpace 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.

```
Private engine As CaoEngine              ..'.. variable for CaoEngine object
Private workspace As CaoWorkspace        ..'.. variable for CaoWorkspace object
Private 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 acquiring the CaoWorkspace object and CaoWorkspace of default are shown as follows.

```
Acquisition of 'CaoWorkspace of default object
Set workspace = engine.Workspaces.Item(0)
```

(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 JSW J-ADS provider, specify connection destination information in the option. The example of the code is shown as follows.

```
 ..'.. generation of CaoController object
Set controller = workspace.AddController("J-ADS", _
                                         "CaoProv.JSW.J-ADS", _
                                         "" _
                                          , _
```

```
                                        "conn = ETH:192.168.1.2")
```

(5) Generate the CaoVariable object. Generate the CaoVariable object of the variable to be connected. Y172 and ALARM of the variable that shows the machine status are specified, and the example of the code of generating the variable object to acquire data is shown as follows.

```
Variable ..'.. addition
 Dim varStatus As CaoVariable
 ..'.. generation of CaoVariable object
 Set varStatus = controller.AddVariable("STATUS_1", "Target=<Y172, ALARM>")
```

4.1.1.2. Acquire the value of the machine status.

Refer to acquire the value to the Value property of the CaoVariable object. The Value property of STATUS<?? > variable is VT_ARRAY. | It becomes the data of the VT_BSTR type. Please refer to chapter 3.3 for details. The example of the code is shown as follows.

```
..'.. acquire the value.
 Dim statusValues() As String
 statusValues = varStatus.value

Return ..'.. value 1
 Dim varY172 As String
 varY172 = statusValues(0)

Return ..'.. value 2
 Dim varALARM As String
 varALARM = statusValues(1)
```

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. JSW J-ADS provider error code

This provider does not have its own error code.
For the common errors of ORiN2, please refer to the error code section in "ORiN2 Programming Guide".
In addition, this provider returns the error code of [NG XX] (XX is the error code in Appendix B) returned from SYSCOM5000i with "0x8010 ****". Also, when an unknown command is sent to the device, the UNKNOWN response returned from the device is acquired as a return value as a string, just like the RawCommand command.
Refer to Appendix B for error codes returned from SYSCOM5000i.

Appendix A. Table for communication protocol command

CaoController::Execute

Command	Communication command
ReadStatus	VGET
ReadLGDATA1	LGET LGDATA1
ReadAlarmLog	LGET ALARM_LOG

CaoVariable::Value

Variable identifier	Communication command
@LGDATA1	LGET LGDATA1 -1
@ALARM_LOG	LGET ALARM_LOG -1
STATUS<??>	VGET

Appendix B. Error code list from SYSCOM5000i

Error number	Explanation
08	The specified variable doesn't exist.
09	The specified variable is not a management variable.