Sumitomo Heavy Industries, Ltd.
SHI InjectionMolding provider

Version 1.1.0

User’s guide

April 11, 2022

Remarks:

・This document uses the machine translation.

【revision history】

Version	Date	Content
1.0.0	2018-07-31	First edition.
	2018-09-18	The sample program has been modified.
1.0.1	2018-09-18	Fixed a bug when connection failed.
	2018-11-30	Corrected the wording of the user's guide.
1.0.2	2021-03-29	Fixed a bug when data was acquired continuously. Fixed the data acquisition logic. Fixed the logic of disconnection processing.
1.1.0	2021-04-11	Fixed a bug when acquiring data including spaces. Added StartTrim and EndTrim options

【Operation confirmed models】

Model	Version	Notes
SE100EV	-	Especially, none

Contents

1. Introduction

This book is an user's guide of the provider (this provider at the following) that acquisition/sets data to the injection molding machine of Sumitomo Heavy Industries, Ltd. (injection molding machine at the following). Figure1-1However, it becomes a whole of injection molding machine block diagram with [u] [dana] type machine provider. This provider sends and receives data by connecting with the injection molding machine with the TCP/IP protocol or RS232C, and using the communication of "New format" form described in the manual of Sumitomo Heavy Industries, Ltd..

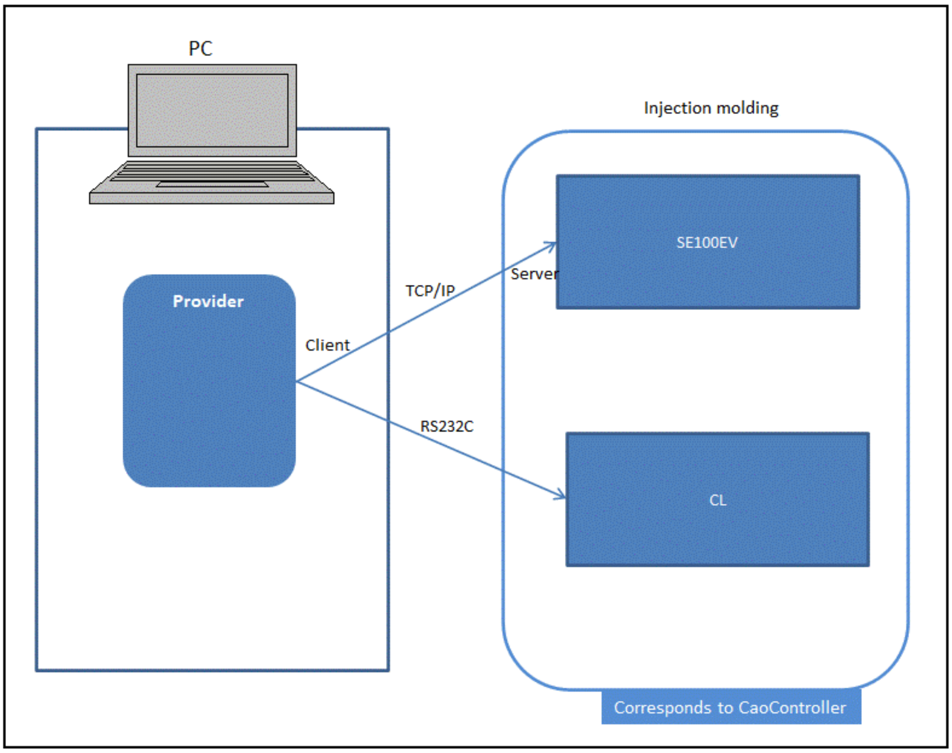


Figure1-1 Block diagram

1.1. Environment and version that this book assumes

Client PC operates on Windows, and the environment whose targeted CNC is possible Ethernet connection's [sei] device kind is assumed. The development setting of PC can be developed in case of the programming environment that supports Component Object Model (COM and Component Object Model).

1.2. Source that becomes reference

C++ and Java though all the programming cases with this book have been described with Visual Basic 6.0. It is possible to develop in various program languages such as NET. It is nerdy..the reference to "ORiN2 programming guide".. for use.

"ORiN 2 programming guide" corresponds to the following files of the ORiN2 SDK installation folder.

- ORiN2¥CAO¥Doc¥ORiN2_ProgrammersGuide_<lang>.pdf

- Replace with the language character string of each environment and read the part of < lang >.

ORiN2 needed in developing the application that uses the provider and COM/DCOM are explained while exchanging the example for basic knowledge and the technology.

Moreover, this provider is made referring to the following files offered by Sumitomo Heavy Industries, Ltd.. Obtain it from Sumitomo Heavy Industries, Ltd. when you want to confirm details of the communication specification.

- Communication between SHI _ personal computer molding machines. pdf
  The communication specification when communicating by the TCP/IP protocol is described.
- [Paso] expert RS232C(020627).pdf
  The communication specification when communicating with RS232C is described.

2. Environmental setup for application development

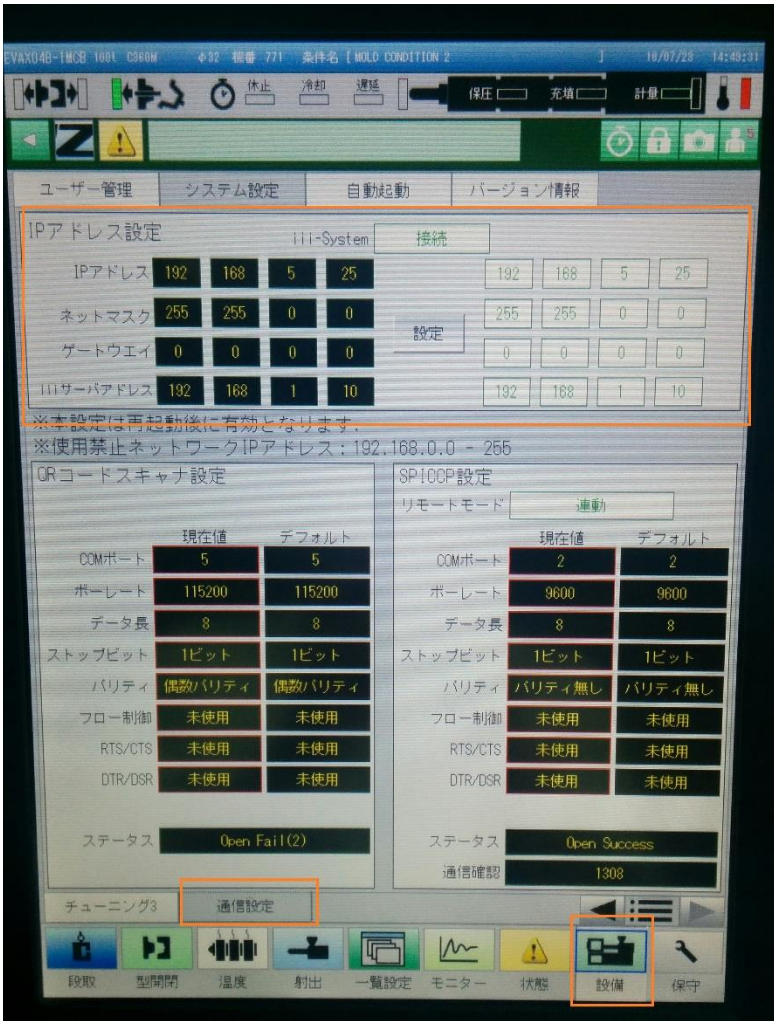
2.1. Connection of injection molding machine and client PC

The injection molding machine and this provider connect it with TCP/IP or RS232C like future [shita]. The connection method in each method is described here.

2.1.1. Ethernet connection

The procedure for connecting client PC and the injection molding machine directly by TCP/IP is shown. The presented image is an injection molding machine: It becomes the person of SE100EV and client PC:Windows10.

① Confirm the network transmission setting on the injection molding machine side described in equipment → network transmission setting tab → Internet Protocol address.



EVAX04B-IMCB 100t C360M φ32 機番 771 条件名 [MOLD CONDITION 2] 18/07/23 14:49:31
休止
冷却
遅延
保圧
充填
計量
段取
型開閉
温度
射出
一覧設定
モニター
状態
設備
保守

ユーザー管理 | システム設定 | 自動起動 | バージョン情報

IPアドレス設定

iii-System 接続

IPアドレス	192	168	5	25	192	168	5	25
ネットマスク	255	255	0	0	255	255	0	0
ゲートウエイ	0	0	0	0	0	0	0	0
iiiサーバアドレス	192	168	1	10	192	168	1	10

設定

※本設定は再起動後に有効となります。
※使用禁止ネットワークIPアドレス：192.168.0.0 - 255

QRコードスキャナ設定

	現在値	デフォルト
COMポート	5	5
ボーレート	115200	115200
データ長	8	8
ストップビット	1ビット	1ビット
パリティ	偶数パリティ	偶数パリティ
フロー制御	未使用	未使用
RTS/CTS	未使用	未使用
DTR/DSR	未使用	未使用

ステータス Open Fail(2)

SPICCP設定

リモートモード 連動

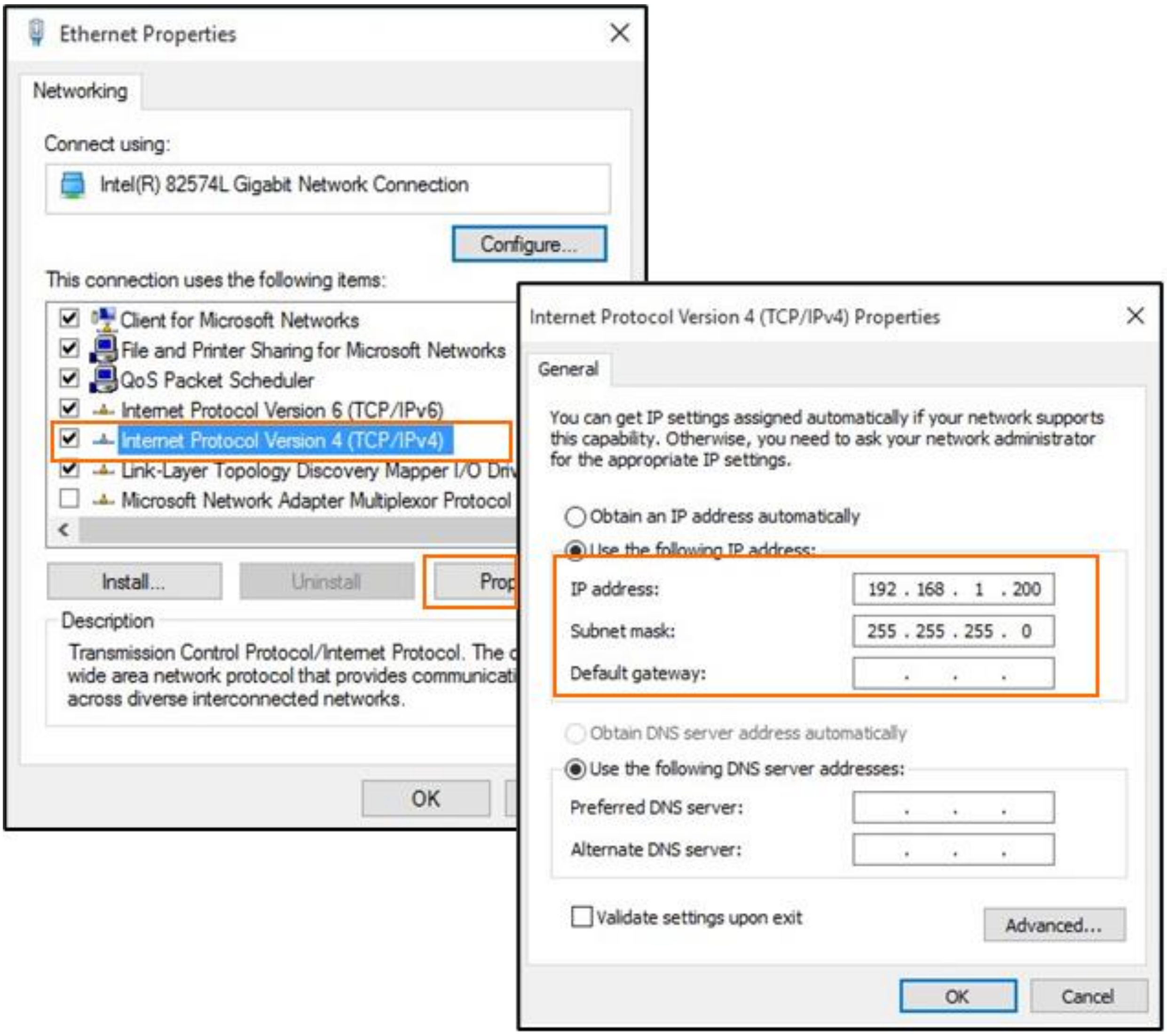
	現在値	デフォルト
COMポート	2	2
ボーレート	9600	9600
データ長	8	8
ストップビット	1ビット	1ビット
パリティ	パリティ無し	パリティ無し
フロー制御	未使用	未使用
RTS/CTS	未使用	未使用
DTR/DSR	未使用	未使用

ステータス Open Success
通信確認 1308

チューニング3 | 通信設定

Figure2-1 Setting of communication of SE100EV screen

② Internet portal site version 4(TCP/Ipv4) → property button is executed from the property in the communication port to be used, and Internet Protocol address of client PC and set the subnet mask according to the network transmission setting on the injection molding machine side.



Connect using:
Intel(R) 82574L Gigabit Network Connection

This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driv
- □ Microsoft Network Adapter Multiplexor Protocol

Description
Transmission Control Protocol/Internet Protocol. The d
wide area network protocol that provides communicati
across diverse interconnected networks.

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
● Use the following IP address:
IP address: 192 . 168 . 1 . 200
Subnet mask: 255 . 255 . 255 . 0
Default gateway: . . .

○ Obtain DNS server address automatically
● Use the following DNS server addresses:
Preferred DNS server: . . .
Alternate DNS server: . . .

□ Validate settings upon exit

Figure2-2 IPv4 setting screen in Windows10

③ Figure2-3Connect Ethernet port to be used with shown injection molding machine side port and [ni] client PC with LAN cable. The communication port exists for SE100EV under the touch panel.

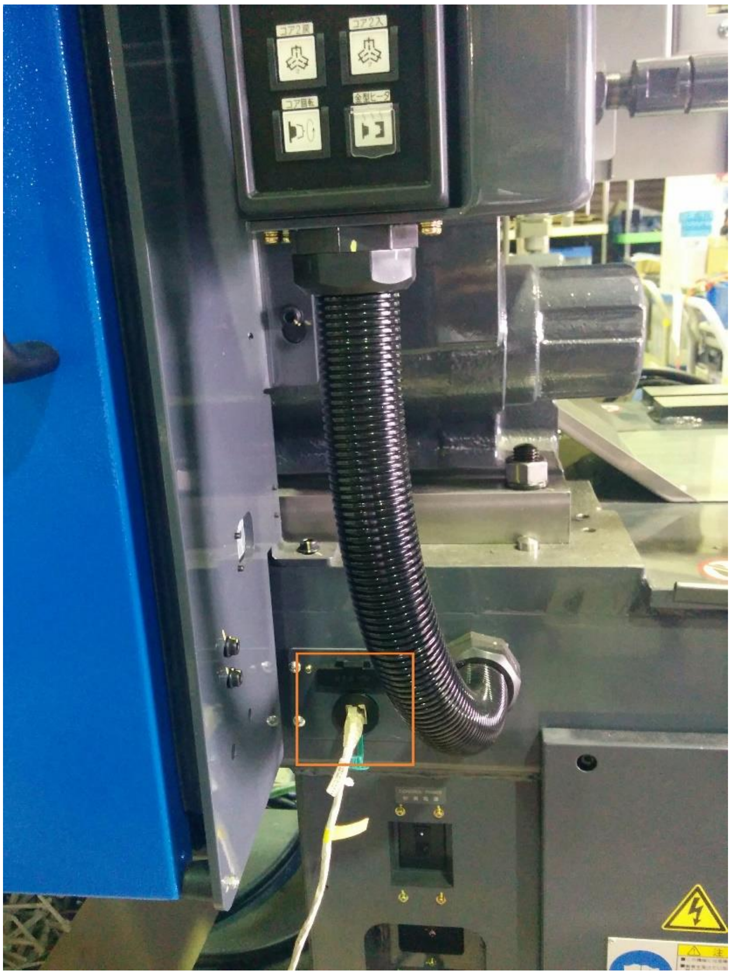


Figure2-3Ethernet port of SE100EV

2.2. Setup of PC development setting

2.2.1. Automated install of [robaida]

If it is an environment in which ORiN2 SDK is installed, the preparation for the system requirements (line time) to connect it with the injection molding machine is completed.

Prepare the programming environment that separately supports Component Object Model (COM and Component Object Model) such as Microsoft Visual Studio 6.0, 2003/2005/2008/2010, and LabVIEW for the setup of the development setting.

2.2.2. Manual installation of provider

It is necessary to register the following registry by the hand work to use this provider. 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.

Table2-1Injection molding machine provider

File name	CaoProvSHIInjectionMolding.dll
ProgID	CaoProv.SHI.InjectionMolding
Registry registration	Regsvr32 "File passing"
Blotting out of registry registration	Regsvr32 /u "File passing"

3. Programming by provider

In this provider, client PC and the injection molding machine can be connected according to the following procedures.

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

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

3.1. Sample programming to acquire present value from SE100EV

The sample program that acquires the cycle time, the filling time, and the measurement time of SE100EV as an example is described here. Table3-1The requirement for [ni] sample programFigure3-1The flow of [ni] sample program is described respectively.

Table3-1Requirement 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 3333.
Content of processing	Read the cycle time.
	Read the filling time.
	Read the measurement time.

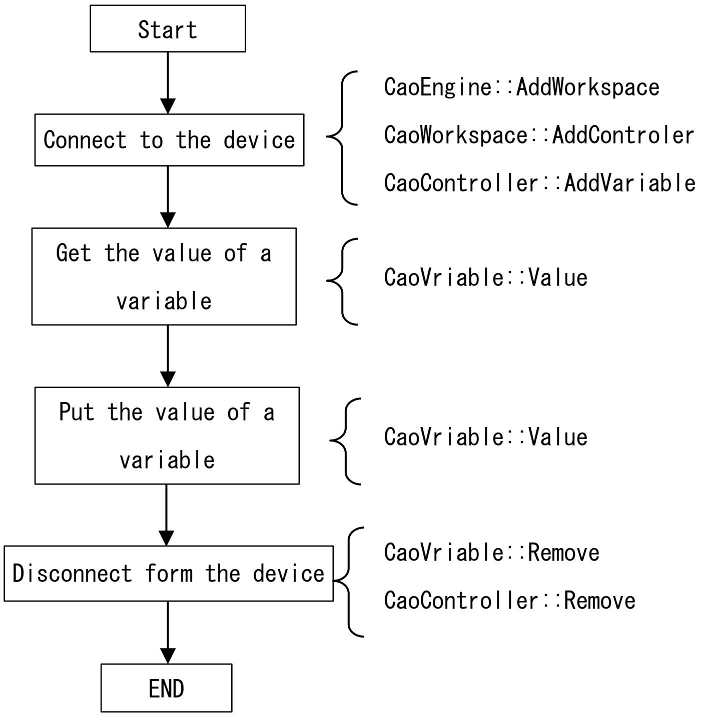

Start
Connect to the device
CaoEngine::AddWorkspace
CaoWorkspace::AddControler
CaoController::AddVariable
Get the value of a variable
CaoVriable::Value
Put the value of a variable
CaoVriable::Value
Disconnect form the device
CaoVriable::Remove
CaoController::Remove
END

Figure3-1 Flow of processing

A concrete code is shown from the following paragraphs.

3.1.1. Sample program

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

Sample	SE100EVSample.vb

```
Sub Main
    ’  object
    Dim engine As caoEngine
    Dim workspace As caoWorkspace
    Dim ctrl As CaoController
    Dim vars(2) As CaoVariable

     ’  generation of CaoEngine object
    Set engine = New caoEngine
     ’  generation of CaoWorkspace object
    Set workspace = engine.AddWorkspace(”NewWrks”, ””)
     ’  generation of CaoController object
    Set ctrl = workspace.AddController(”SE100EV”, _
                                   ”CaoProv.SHI.InjectionMolding”, _
                                   ””, _
                                   ”Conn=eth:192.168.1.2”)
     ’  generation of CaoVariable object
    Set vars(0) = ctrl.AddVariable(”DATA_CycleTime”, ”ID=VAT1T300”)
    Set vars(1) = ctrl.AddVariable(”DATA_FillingTime”, ID=VAT1T301)
    Set vars(2) = ctrl.AddVariable(”DATA_MeasurementTime”, ID=VAT1T302)
    ’  acquire the value of the variable.
    Dim values(2) As String
    Dim i As Integer
    For i = 0 To 2
        values(i) = vars(i).Value
    Next i

    ’  deletion of CaoVariable
    Call ctrl.Variables.Clear
    For i = 0 To 2
        Set vars(i) = Nothing
    Next i

    ’  delete CaoController from CaoWorkspace.
    Call workspace.Controllers.Remove(ctrl.Index)
    ’  deletion of CaoController
    Set ctrl = 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
```

3.1.1.1. Connection

Take the following procedures to connect it with the injection molding machine.

(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.

```
’  object
Dim engine As caoEngine
Dim workspace As caoWorkspace
Dim ctrl As CaoController
Dim vars(2) As CaoVariable
```

(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 this provider, specify the COM port number used Internet Protocol address or to communicate the connection destination in the option. The example of the code when connecting it by TCP/IP is shown as follows.

```
’  generation of CaoController object
Set ctrl = workspace.AddController(″SE100EV″, _
                                   ″CaoProv.SHI.InjectionMolding″, _
                                   ″″
                                     , _
                                   ″Conn=eth:192.168.1.2″)
```

(5) Generate the CaoVariable object. Set the operation condition of the variable identifier and the variable to generate the CaoVariable object. Here, add the DATA variable that is the variable to acquire information from the injection molding machine. Details of the DATA variable4.3.1.3 DATA<??>See [wo].

```
’  generation of CaoVariable object
Set vars(0) = ctrl.AddVariable(″DATA_CycleTime″, ″ID=VAT1T300″)
Set vars(1) = ctrl.AddVariable(″DATA_FillingTime″, ID=VAT1T301)
Set vars(2) = ctrl.AddVariable(″DATA_MeasurementTime″, ID=VAT1T302)
```

3.1.1.2. Acquire the cycle time, the filling time, and the measurement time.

Use the Value property of the added CaoVariable variable to acquire the value. The Value property of the DATA variable can acquisition/set data by the character string.

```
’  acquire the value of the variable.
Dim values(2) As String
Dim i As Integer
For i = 0 To 2
   values(i) = vars(i).Value
Next i
```

3.1.1.3. 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.

```
 ’  deletion of CaoVariable
Call ctrl.Variables.Clear
For i = 0 To 2
   Set vars(i) = Nothing
Next i
 ’  delete CaoController from CaoWorkspace.
Call workspace.Controllers.Remove(ctrl.Index)
 ’  deletion of CaoController
Set ctrl = Nothing
 ’  delete CaoWorkspace from CaoEngine.
Call engine.Workspaces.Remove(workspace.Index)
 ’  deletion of CaoWorkspace
Set workspace = Nothing
 ’  deletion of CaoEngine
Set engine = Nothing
```

4. Command reference

4.1. Method/property list

Table4-1Method/property list

Category	[1]Method/property		Function	Reference
CaoWorkspace				
	Addcontroller	M	Connect it with the controller.	P. 16
CaoController				
	VarialbeNames	P	Acquisition of variable identifier list that can be connected	P. 19
	Variables	P	Acquisition of variable collection that controller maintains	P. 19
	AddVariable	M	Addition of variable object	P. 20
CaoVariable				
	ID	P	Acquisition/setting of ID	P. 21
	Index	P	Acquisition of task number	P. 21
	Name	P	Acquisition of task name	P. 22
	Value	P	Acquisition/setting of value	P. 22

4.2. Method property

4.2.1. CaoWorkspace class

4.2.1.1. AddController method

Add the controller object to CaoWorkspace. In this provider, connect it with the corresponding injection molding machine 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.SHI.InjectionMoldging",     // Provider name (fixation)
        "< machine name >"                   // Provider execution machine name
```

[1] M: method, P: property, E: event are shown respectively.

```
(unused)
        "< option >"                    // Optional character string
)
```

Usage example

```
     Engine ..Dim caoEng As CaoEngine '.. object
     WorkSpace ..Dim caoWs As CaoWorkspace '.. object
     Controlle ..Dim caoCtrl As CaoController '.. object

    Set caoEng = New CaoEngine
    Set caoWS = caoEng.CaoWorkspaces.Item(0)
    Set caoCtrl = caoWS.AddController("SHI", _
                                "CaoProv.SHI.InjectionMolding", _
                                "", _
                                "Conn = Eth:192.168.0.1,Timeout = 1000")
```

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	-	Specify parameter in communication tools. Please refer to chapter 4.2.1.1.1 for details.	-	-
Timeout	--	Specify the response standby time by the unit of ms.	1 - 65535	500

4.2.1.1.1. Conn is optional.

The injection molding machine corresponds to the communication by TCP/IP and RS232C like future [shita]. This provider tries the connection with the injection molding machine in the option Conn to correspond to these two communication methods by the specified communication method.

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.

- **When connecting it by TCP/IP**

"Conn=TCP:< IP Address >[< port >]"

＜ IPAddress ＞ ： Specify connection destination Internet Protocol address. Specify this item.

＜ port ＞ ： Specify the connection destination port number. 33333

- **When connecting it with RS232C**

"Conn=COM:<COM Port>[:BaudRate>[:<Parity>:<DataBits>:<StopBits>[:Flow]]]"

< COM port > : Use port number. Specify this item.

< baud rate > : Transmission rate. 4800, 9600, 19200, 38400, 57600. 115200

< parity > : Parity. 'N' (NONE), 'E' (EVEN), 'O' (ODD)

< data bit > : '7' (7bit), '8' (8bit)

< stop bit > : Number of stop bits. '1' (1bit), '2' (2bit)

< flow control >: Flow control bit flag.
'0' (None), '1' (Xon/Xoff), and '2'([ha-dowe] control)

4.2.2. CaoController class

4.2.2.1. VarialbeNames property

Acquire the variable identifier list that can be connected. Describe the variable identifier acquired in this property later.

Usage example

```
     Engine ..Dim caoEng As CaoEngine '.. object
     WorkSpace ..Dim caoWs As CaoWorkspace '.. object
     Controlle ..Dim caoCtrl As CaoController '.. object

    Set caoEng = New CaoEngine
    Set caoWS = caoEng.CaoWorkspaces.Item(0)
    Set caoCtrl = caoWS.AddController("SHI", _
                                     "CaoProv.SHI.InjectionMolding", _
                                     "", _
                                     "Conn = Eth:192.168.0.1,Timeout = 1000")

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

4.2.2.2. Variables property

Acquire the variable collection that the controller maintains.

Usage example

```
     Engine ..Dim caoEng As CaoEngine '.. object
     WorkSpace ..Dim caoWs As CaoWorkspace '.. object
     Controlle ..Dim caoCtrl As CaoController '.. object

    Set caoEng = New CaoEngine
    Set caoWS = caoEng.CaoWorkspaces.Item(0)
    Set caoCtrl = caoWS.AddController("SHI", _
                                     "CaoProv.SHI.InjectionMolding", _
                                     ""
                                       , _
                                     "Conn = Eth:192.168.0.1,Timeout = 1000")

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

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

4.2.2.3. AddVariable method

Add the variable object to CaoController. Only the ones shown in 4.3.1 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
)
```

4.2.3. CaoVariable class

4.2.3.1. ID property

When CaoVriable is only DATA variable, it is possible to use it. Acquisition/set target command ID for the DATA variable. Command ID is different depending on the model of the connection destination. Inquire of Sumitomo Heavy Industries, Ltd. about command ID of the object.

Usage example

```
     Engine ..Dim caoEng As CaoEngine '.. object
     WorkSpace ..Dim caoWs As CaoWorkspace '.. object
     Controlle ..Dim caoCtrl As CaoController '.. object

    Set caoEng = New CaoEngine
    Set caoWS = caoEng.CaoWorkspaces.Item(0)
    The connection destination '  is assumed to be SE100EV.
    Set caoCtrl = caoWS.AddController("SHI", _
                                      "CaoProv.SHI.InjectionMolding", _
                                      "", _
                                      "Conn = Eth:192.168.0.1,Timeout = 1000")

    Variable..addition..cycle..time..acquire..variable.
    Dim caoVar As CaoVariable
    Set caoVar = caoCtrl.AddVariable("DATA_Sample", "ID = VAT1T300")

    'ID acquisition
    Dim id as String
    id = caoVar.ID

    'ID setting (Make the acquisition object filling time).
    caoVar.ID = "VAT1T301"
```

Data type

Type explanation	
VT_BSTR	Command ID of set acquisition/object

4.2.3.2. Index property

Acquire the variable number in the Long type (four byte integer type). This number shows whether the variable of the correspondence is data of the variable collection that the CaoController class maintains how many.

Usage example

```
     Engine ..Dim caoEng As CaoEngine '.. object
     WorkSpace ..Dim caoWs As CaoWorkspace '.. object
     Controlle ..Dim caoCtrl As CaoController '.. object

    Set caoEng = New CaoEngine
    Set caoWS = caoEng.CaoWorkspaces.Item(0)
    The connection destination '  is assumed to be SE100EV.
    Set caoCtrl = caoWS.AddController(″SHI″, _
                                      ″CaoProv.SHI.InjectionMolding″, _
                                      ″″, _
                                      ″Conn = Eth:192.168.0.1,Timeout = 1000″)

    Variable..addition..cycle..time..acquire..variable.
    Dim caoVar As CaoVariable
    Set caoVar = caoCtrl.AddVariable(″DATA_Sample″, ″ID = VAT1T300″)

    'Index acquisition
    Dim index as Long
    index = caoVar.Index
```

4.2.3.3. Name property

Acquire the variable identifier specified by the AddRobot method of the CaoContrller class.

Usage example

```
     Engine ..Dim caoEng As CaoEngine '.. object
     WorkSpace ..Dim caoWs As CaoWorkspace '.. object
     Controlle ..Dim caoCtrl As CaoController '.. object

    Set caoEng = New CaoEngine
    Set caoWS = caoEng.CaoWorkspaces.Item(0)
    The connection destination '  is assumed to be SE100EV.
    Set caoCtrl = caoWS.AddController(″SHI″, _
                                      ″CaoProv.SHI.InjectionMolding″, _
                                      ″″, _
                                      ″Conn = Eth:192.168.0.1,Timeout = 1000″)

    Variable..addition..cycle..time..acquire..variable.
    Dim caoVar As CaoVariable
    Set caoVar = caoCtrl.AddVariable(″DATA_Sample″, ″ID = VAT1T300″)

    Debug.Print caoVar. Name
```

4.2.3.4. Value property

Acquisition/set data from the connected injection molding machine. Operation is different depending on the variable identifier.

4.3. Variable list

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

4.3.1. CaoController class variable

Variable identifier	Explanation	Value		Reference
		get	put	
@MAKER_NAME	Acquire the manufacturer name.	○	–	P.23
@VERSION	Acquire the DLL version.	○	–	P.23
DATA<??>	Acquisition/set information on the injection molding machine.	○	○	P.24

4.3.1.1. @MAKER_NAME

Acquire the manufacturer name.

Usage example

```
    Dim engine As caoEngine
    Dim workspace As caoWorkspace
    Dim ctrl As CaoController
    Set engine = New caoEngine
    Set workspace = engine.AddWorkspace("NewWrks", "")
    Set caoCtrl = caoWS.AddController("SHI", _
                                     "CaoProv.SHI.InjectionMolding", _
                                     ""
                                       , _
                                       "Conn = Eth:192.168.0.1,Timeout = 1000")
    Variable '  addition
    Dim var As CaoVariable
    Set var = ctrl.AddVariable("@MAKER_NAME")
    Value '  acquisition
    Dim strVal As String
    strVal = var.value
```

Data type

Type explanation	
VT_BSTR	Acquire the manufacturer name.

4.3.1.2. @VERSION

Acquire the version of DLL.

Usage example

```
    Dim engine As caoEngine
    Dim workspace As caoWorkspace
    Dim ctrl As CaoController
    Set engine = New caoEngine
    Set workspace = engine.AddWorkspace("NewWrks", "")
    Set caoCtrl = caoWS.AddController("SHI", _
                                     "CaoProv.SHI.InjectionMolding", _
```

```
                                           ""
                                             , _
                                    "Conn = Eth:192.168.0.1,Timeout = 1000")
    Variable '  addition
    Dim var As CaoVariable
    Set var = ctrl.AddVariable("@VERSIONE")
    Value '  acquisition
    Dim value As String
    value = var.value
```

Data type

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

4.3.1.3. DATA<??>

Acquisition/set information on the injection molding machine. Make an arbitrary character string specifying it since DATA. Do not care about the dead letter character either. When the DATA variable is generated, it is necessary to specify command ID that becomes a set acquisition/object. Which operation of acquisition/setting is possible depends on command ID. Command ID that can be used is different in each model, and inquire of Sumitomo Heavy Industries, Ltd. also.

It doesn't become an error according to command ID when it tries to set an illegal value when the value is set, the value might be cleared, and use it very carefully.

Usage example

```
    Dim engine As caoEngine
    Dim workspace As caoWorkspace
    Dim ctrl As CaoController
    Set engine = New caoEngine
    Set workspace = engine.AddWorkspace("NewWrks", "")
    Set caoCtrl = caoWS.AddController("SHI", _
                                     "CaoProv.SHI.InjectionMolding", _
                                     ""
                                       , _
    "Conn = Eth:192.168.0.1,Timeout = 1000")

    Variable '  addition (cycle time (ID=VAT1T300))
    Dim var As CaoVariable
    Set var = ctrl.AddVariable("DATA_Cycletime", "ID=VAT1T300")

    Value '  acquisition
    Dim strVal As String
    strVal = var.value
```

Data type

Type explanation	
VT_BSTR	Acquisition/set the value corresponding to specified command ID.

Option	Require	Explanation
ID=<command ID>	○	Specify the command ID.
StartTrim[=TRUE/FALSE]	-	If TRUE is specified, the extra space is deleted from the beginning of the acquired data. If you intentionally put a blank character at the beginning of character string type data, set it to FALSE. Default(TRUE)
EndTrim[=TRUE/FALSE]	-	If TRUE is specified, the extra space is deleted from the end of the acquired data. If you intentionally put a space character at the end of the character string type data, set it to FALSE. * However, if the data is less than the minimum size, a blank character string will be added accordingly. Example) For CL series, 18 characters is the minimum size. If EndTrim = FALSE and the data including the trailing blank string is 13 characters, 5 blanks will be added at the end. Text data: ABCDEFGHIJKL_ (13 characters) Actual data acquired: ABCDEFGHIJKL______ (18 characters) _…space Default(TRUE)

5. Injection molding machine 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 Programming Guide Refer to the chapter of the error code of".

Table5-1Original error code table

Error number	Explanation
0x80110001	It is not specified that indispensability is optional. When the object is made without specifying that indispensability is optional, it is generated. It is necessary to specify that indispensability is optional described in the user's guide.
0x80110002	The specified communication method is different. When CaoController is made, the specified communication method is generated for UDP optional Conn it. Make CaoController specifying COM/TCP/ETH.
0x80110003	The value specified in the option is outside the range. It is generated when the value of the option specified for at least one option is outside the range. Specify the value within the range of the value described in each option.
0x80110004	The checksum of receive data is illegal. When the provider judges the checksum of the data received from the injection molding machine to be illegal, it is generated. There is a possibility that the loss of data has occurred. Confirm the communication environment.
0x80110005	Command ID of receive data is different. When command ID described in the data received from command ID and the injection molding machine that the provider demanded is different, it is generated.
0x80110006	It is other packet error. When the response outside assumption returns, it is generated. Confirm whether it is a corresponding model.
0x801000** (**: 0x04, 0x06, 0x15)	Do the error reply from the injection molding machine and do the mask with 0x801000**. 0x04: EOT was received. 0x06: ACK was received in the situation that was not the sequence that

Error number	Explanation
	received ACK. 0x15: NAK was received.

Appendix A. Table for communication protocol command

Enumerate correspondence with each method property of the command name and the provider described in referred the communication specifications here.

CaoVariable

Variable identifier	Get_Value	Set_Value
DATA<??>	Reading of data (new format)	Setting of data (new format)