14 Reading Device/PLC from Database

14.1 Try to Read Device/PLC Data from Database 14-2
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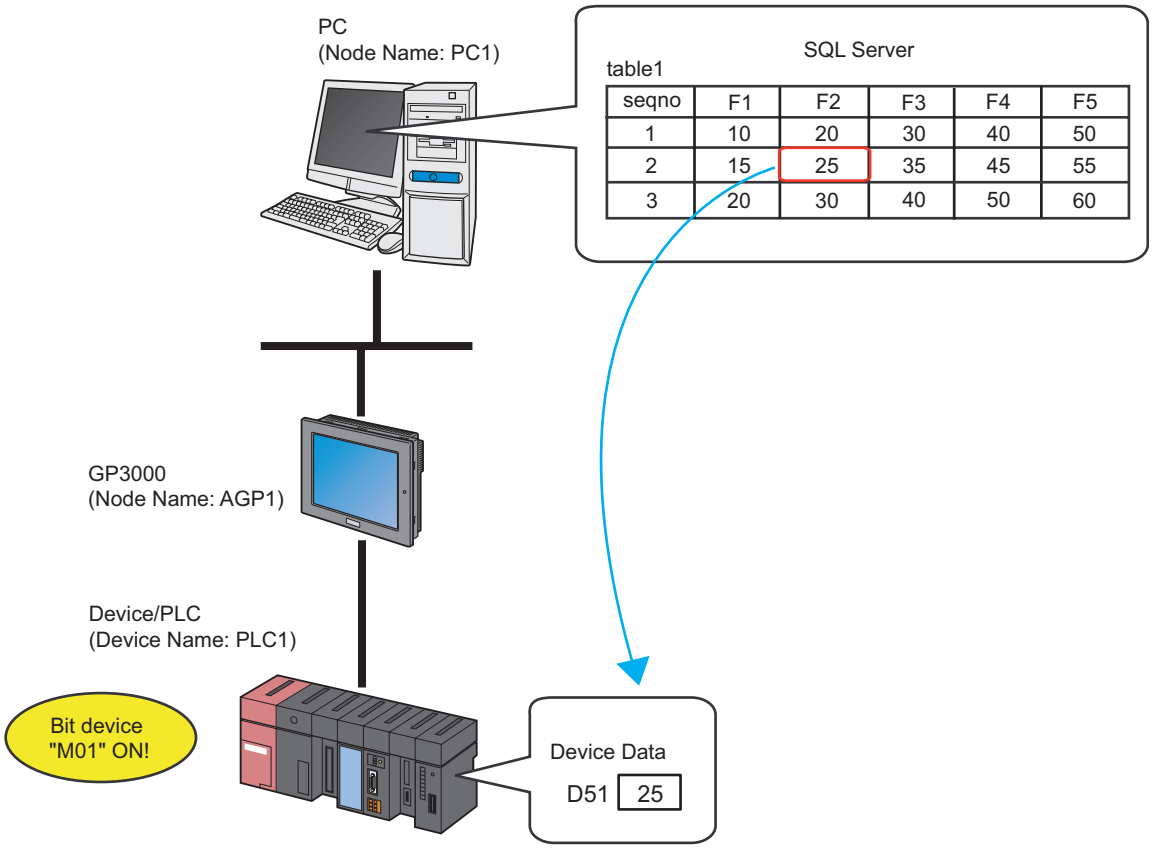
14.1 Try to Read Device/PLC Data from Database

[Action Example]

Detect the rising of the trigger device (bit device: "M01") of Device/PLC, read data from the field (F2) set for the trigger device in a relational database, and write the data into a specified device address.



This section describes the setting procedures for executing the above action (ACTION) as an example.

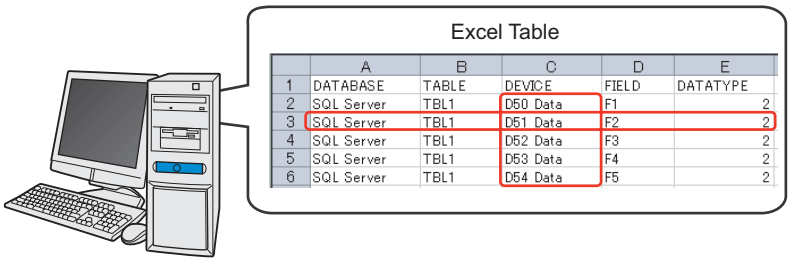
[Setting Procedure]

1	Creating a Table	This step creates a table to specify the database to read data from or the device to write data in.
2	Creating a Database	This step creates a database table containing data to write in the device of Device/PLC.
3	Starting 'Pro-Studio EX'	This step starts 'Pro-Studio EX'.
4	Registering Entry Nodes	This step registers the PC and the GPs as entry nodes.
5	Registering Symbols	This step registers as a symbol the device of Device/PLC which serves as a trigger condition (trigger) and a data write destination.
6	Parameter Setting for Feature (ACTION)	This step sets the following items: • Database informaiton • Database access method • File specification
7	Setting Trigger Conditions	This step sets conditions (trigger) for executing data write.
8	Setting Data Received by ACTION	This step sets a constant value to be the sequence No. (seqno) of a database.
9	Setting ACTION Node/Process Completion Notification	This step sets the name of an ACTION node and the alert setting whether it should be tuned on or off when the ACTION is completed.
10	Verifying Setting Result	This step verifies setting results on the setting content list screen.
11	Saving a Network Project File	This step saves the current settings as a network project file and reloads.
12	Transferring a Network Project File	This step transfers a saved network project file to the GP.
13	Executing ACTION	This step verifies that database data is written in the device of Device/PLC when the preset trigger condition has become effective.

14.1.1 Creating a Table

This step creates a table that specifies the database(s) from which data is read and the device(s) to which data is written.

'Pro-Server EX' retrieves database information by referencing transfer data ("Constant Value" of the transfer source specified in "14.1.8 Setting Data Received by ACTION") and rows in the Excel table.



	A	B	C	D	E
1	DATABASE	TABLE	DEVICE	FIELD	DATATYPE
2	SQL Server	TBL1	D50 Data	F1	2
3	SQL Server	TBL1	D51 Data	F2	2
4	SQL Server	TBL1	D52 Data	F3	2
5	SQL Server	TBL1	D53 Data	F4	2
6	SQL Server	TBL1	D54 Data	F5	2

<table>
<tr><th>Table type</th><th>Description</th></tr>
<tr><td>'Microsoft Excel'</td><td>Read data directly from database.
<table>
<tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th></tr>
<tr><td>1</td><td>DATABASE</td><td>TABLE</td><td>DEVICE</td><td>FIELD</td><td>DATATYPE</td></tr>
<tr><td>2</td><td>DBA</td><td>table1</td><td>D100</td><td>field1</td><td>2</td></tr>
<tr><td>3</td><td>DBA</td><td>table1</td><td>D101</td><td>field2</td><td>2</td></tr>
<tr><td>4</td><td>DBB</td><td>table2</td><td>D102</td><td>field3</td><td>2</td></tr>
</table></td></tr>
<tr><td>'Microsoft Access'</td><td>Data is first written from database to Access, and then read from Access.
<table>
<tr><th></th><th>DATABASE</th><th>TABLE</th><th>DEVICE</th><th>FIELD</th><th>DATATYPE</th></tr>
<tr><td></td><td>DBA</td><td>table1</td><td>D100</td><td>field1</td><td>2</td></tr>
<tr><td></td><td>DBA</td><td>table1</td><td>D101</td><td>field2</td><td>2</td></tr>
<tr><td></td><td>DBB</td><td>table2</td><td>D102</td><td>field3</td><td>2</td></tr>
</table></td></tr>
</table>

1 Start 'Microsoft Excel' and create the table below.

DATABASE	TABLE	DEVICE	FIELD	DATATYPE
SQL Server	TBL1	D50 data	F1	2
SQL Server	TBL1	D51 data	F2	2
SQL Server	TBL1	D52 data	F3	2
SQL Server	TBL1	D53 data	F4	2
SQL Server	TBL1	D54 data	F5	2

Below are the contents of each item of this table.

[DATABASE]

Set the name of the database from which data is read.

[TABLE]

Set the name of the database table from which data is read.

[DEVICE]

Set the device or symbol name of the device to which data is written.

[FIELD]

Set the field of the database table from which data is read.

[DATATYPE]

Set the type of data to write.

Specify the data type as the following table shows.

Value	Data Type	Value	Data Type
1	Bit	7	32 bits without decimal code
2	16 bits with decimal code	8	Hexadecimal 32 bits
3	16 bits without decimal code	9	BCD 32 bits
4	Hexadecimal 16 bits	10	Single precision floating point
5	BCD 16 bits	11	Double-precision floating point
6	32 bits with decimal code	12	Character string

NOTE

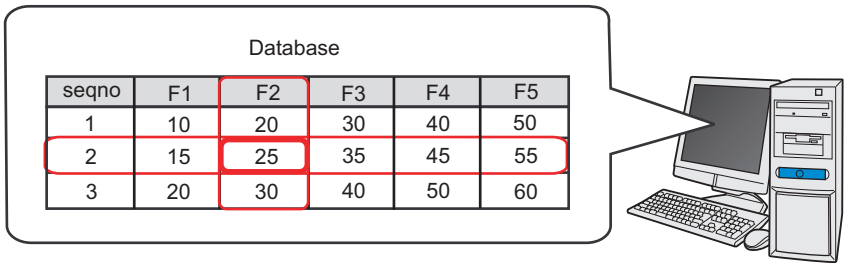
- Do not fail to enter table item names like [DATABASE] or [TABLE] in the first row of Excel sheets.
- There is a sample file (ProDB.xls) of an Excel table in the "PRO-SDK" folder where Pro-Server EX has been installed. Use this as a template when creating a table.

2 Save it on PC desktop with the file name "exceltable.xls" after creating.

14.1.2 Creating a Data Table

This step creates a database table to store data to read out (recipe data).

'Pro-Server EX' obtains data in the [FIELD] row specified on an Excel table , referring to data to transfer (which is "Fixed vale" of the transfer source set in "14.1.8 Setting Data Received by ACTION") and "seqno" data on a database table.



Create the table below on a database.

seqno	F1	F2	F3	F4	F5
1	10	20	30	40	50
2	15	25	35	45	55
3	20	30	40	50	60

NOTE

- Do not use "0" for "seqno" value. If data to transfer is not a character string, the lowest row of the table is searched when the data is "0".
- Do not use any character string containing " ' " (apostrophe) for "seqno" value.
- If you use "DSN", there is a sample file (DataBase.mdb) of a data table available in the "PRO-SDK" folder where Pro-Server EX has been installed. Use this as a template when creating a table.

14.1.3 Starting 'Pro-Studio EX'

This step starts 'Pro-Studio EX'.

Refer to "3 Trial of Pro-Server EX" for details about starting method.

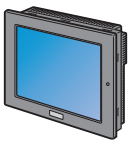
14.1.4 Registering Entry Nodes

This step registers the PC and the GP connected with network as nodes.

Refer to "31 Node Registration" for details about entry nodes.

Node Name :PC1

IP Address :192.168.0.1



Node Name :AGP1

IP Address :192.168.0.100

Device/PLC Information

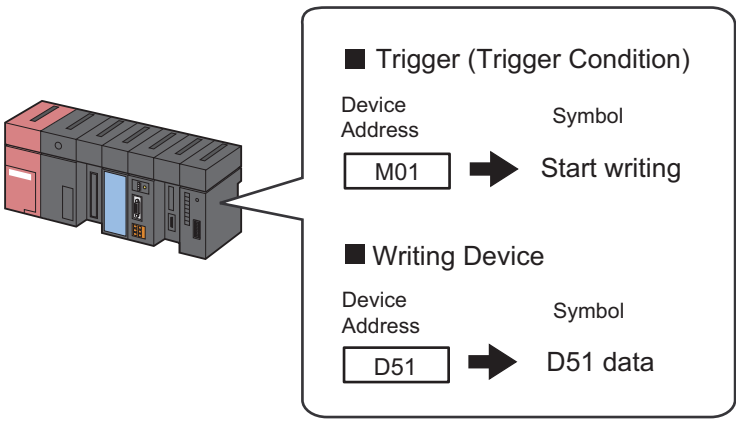
Ex.

Entry node	Setting item	Setting example
PC	Node Name	PC1
	IP Address	192.168.0.1
GP	Type	GP3000 series
	Node Name	AGP1
	IP Address	192.168.0.100

14.1.5 Registering Symbols

This step registers as a symbol the device address of Device/PLC which serves as a trigger condition (trigger) and the device of Device/PLC to write data in.

Refer to "32 Symbol Registration" for details about entry nodes.



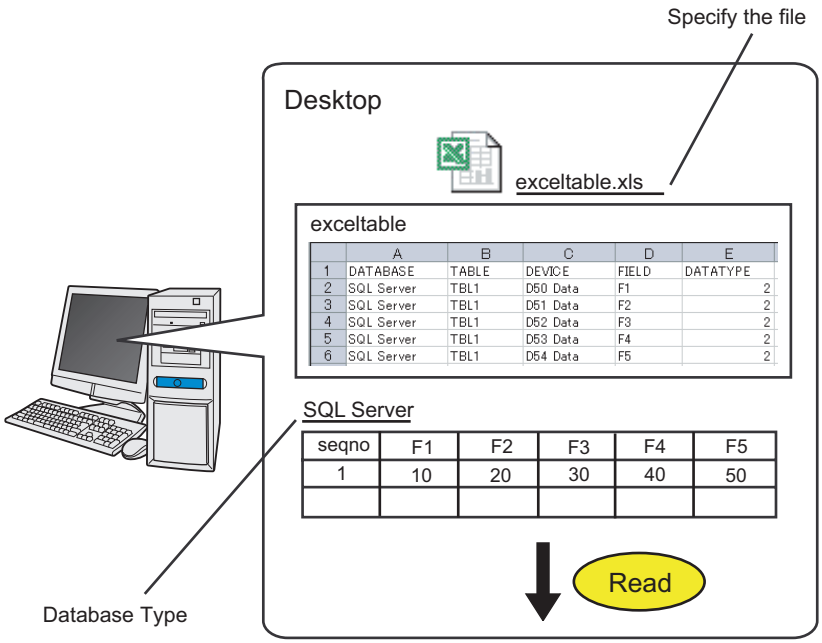
Ex.

Setting item	Trigger (trigger condition)	Writing device
Symbol Name	Start writing	D51 data
Data Type	Bit	16Bit (Signed)
Device address for symbol registration	"M01" of Device/PLC (PLC1)	"D51" of Device/PLC (PLC1)
No. of Devices	1	1

14.1.6 Parameter Setting for Feature (ACTION)

This step makes settings to write database data in a device. (parameter settings)

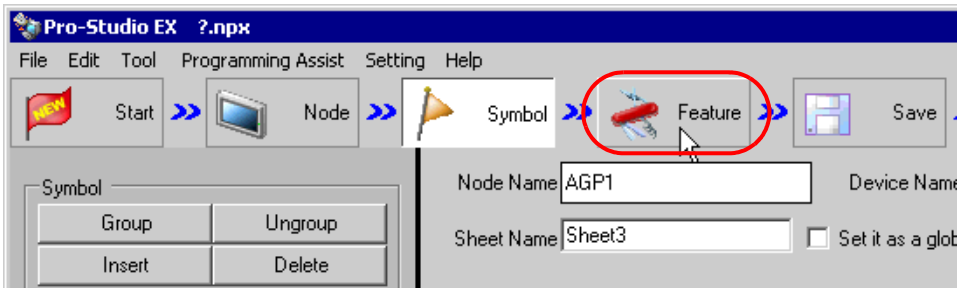
Refer to "14.2 Setting Guide" for more details about ACTION parameter.



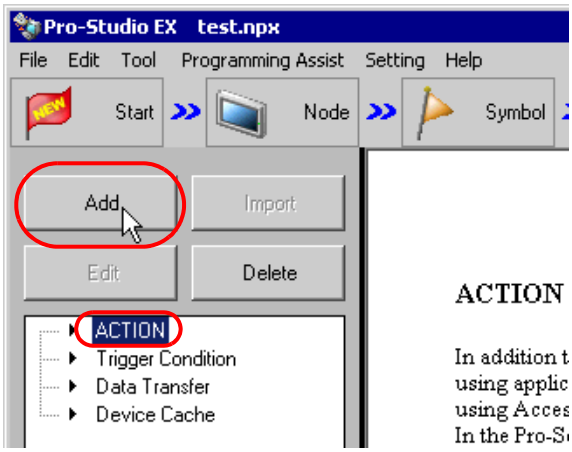
Ex.

Setting item	Setting content
Login Name	login
Password	abcde
Server Name	server
Database Type	SQL Server
Database Access Method	Access directly to database (EXCEL)
File Specification	C:\Documents and Settings\Administrator\Desktop\exceltable.xls

1 Click the [Feature] icon on the status bar.

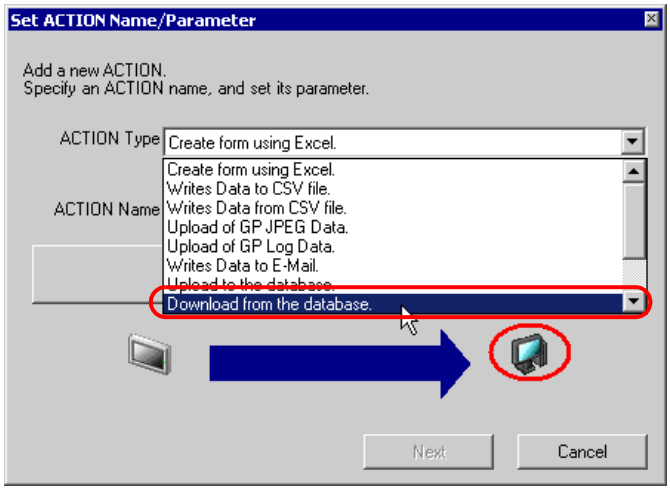


2 Select [ACTION] from the tree display on the left of the screen, then click the [Add] button.

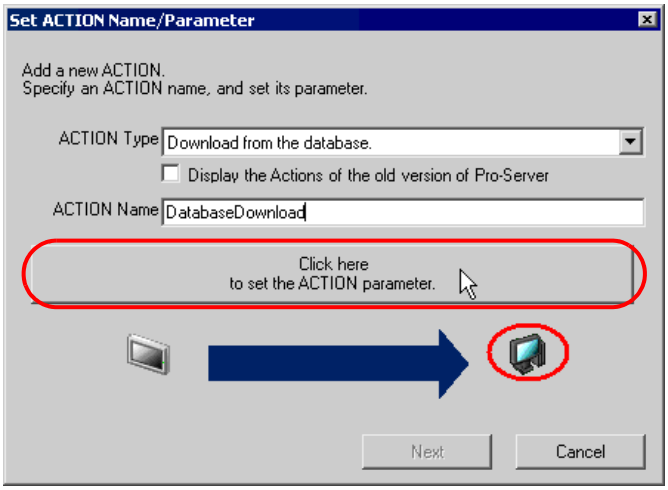


3 Click the [ACTION Type] list button, and select "Download from the database".
Then, enter the name of ACTION to set in the [ACTION Name] field. In this example, enter "Database Download".

NOTE • [ACTION Name] can be an arbitrary name.

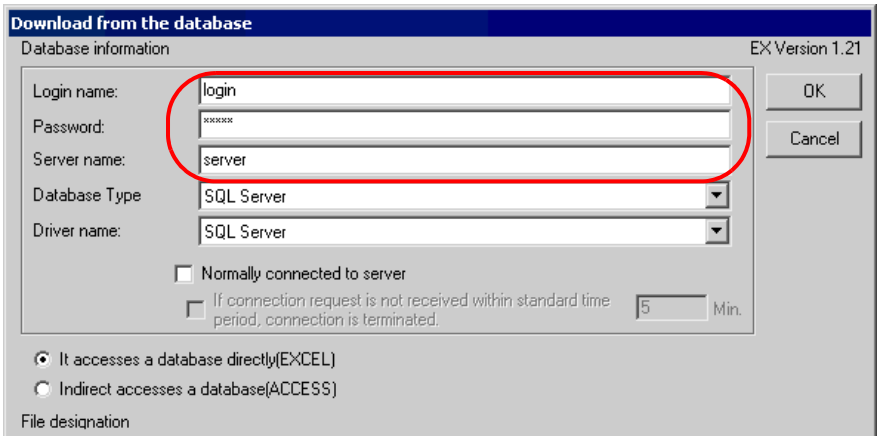


4 Click the [Click here to set the ACTION parameter] button.

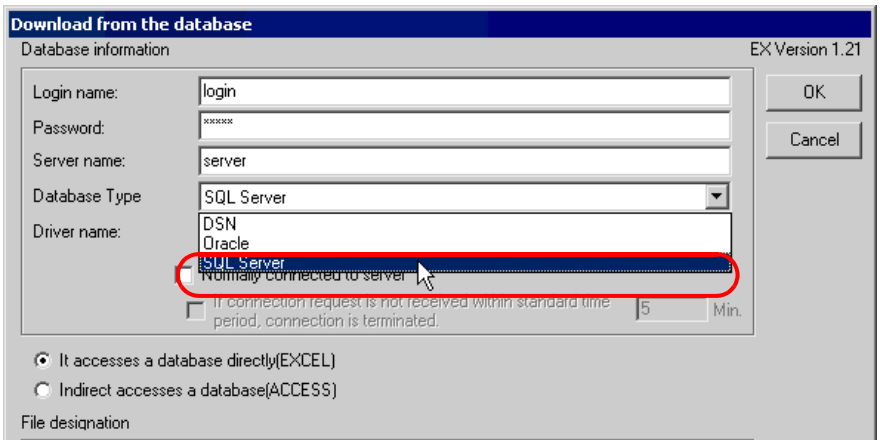


5 Make settings regarding a database.

1) Set "login" in [Login name] and "abcde" in [Password] to access the database server with, and "server" in [Server name] for the database server PC name.



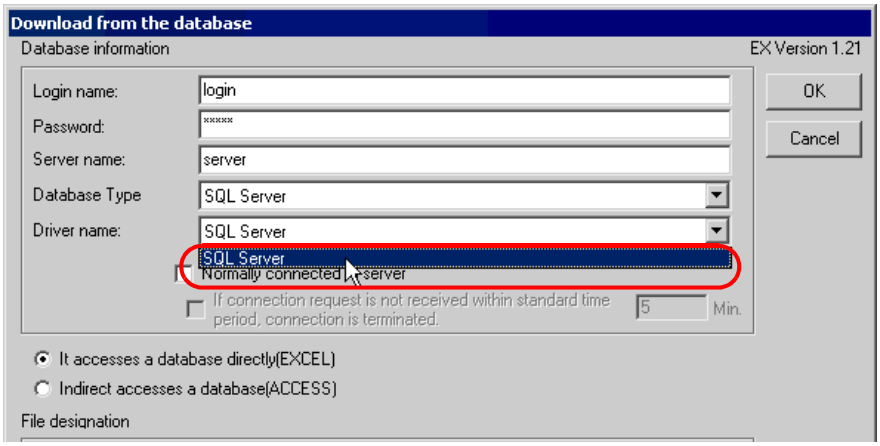
2) Set "SQL Server" in [Database Type].



NOTE

- If you select "DSN" in [Database Type], you do not have to set [Server name].
- [SQL Server] supports SQL Server 2000 only.

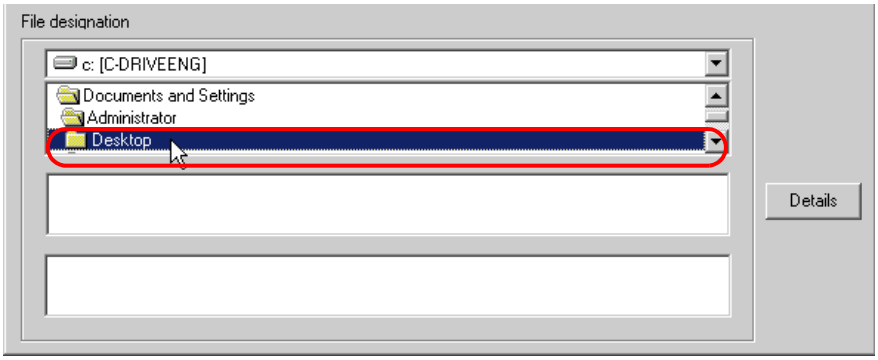
3) Set "SQL Server" in [Driver name].



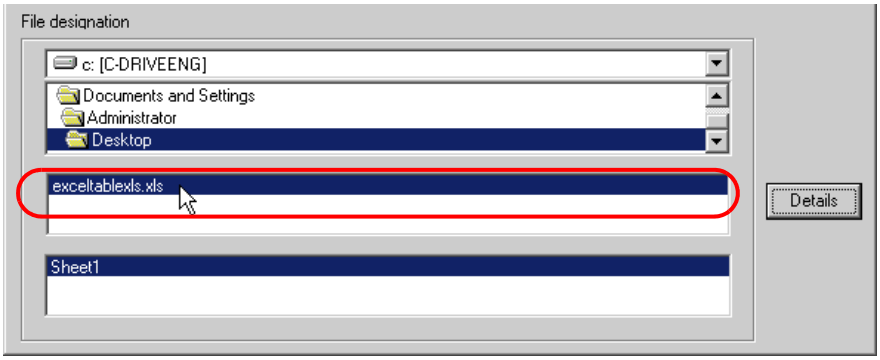
6 Select "It accesses a database directly (EXCEL)" as an access method.

7 Make settings regarding a file (a table).

1) Set "Desktop" as the destination to save in the upper list box.



2) Select the Excel table file name "exceltable.xls".



8 Click the [OK] button.

This is the end of the feature (ACTION) settings.

14.1.7 Setting Trigger Conditions

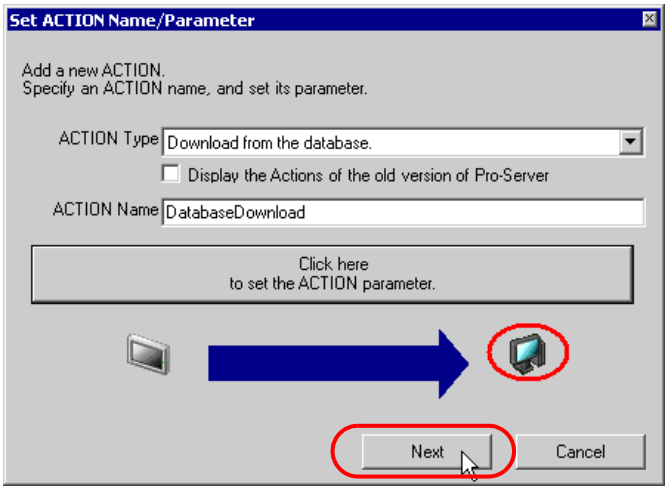
This step sets a trigger condition (trigger bit ON) to read out device data.

Refer to "33 Trigger Conditions" for details about trigger conditions.

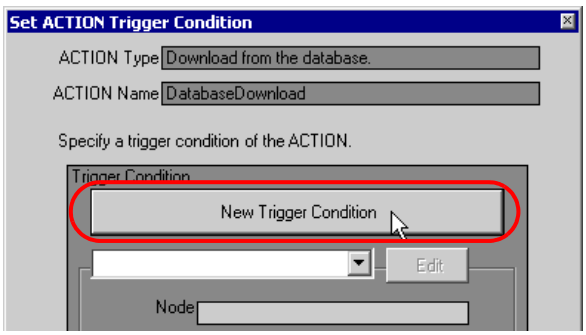
Ex.

- Trigger Condition Name: Turn on write start bit
- Trigger Condition : When "Start writing" (M01) is ON

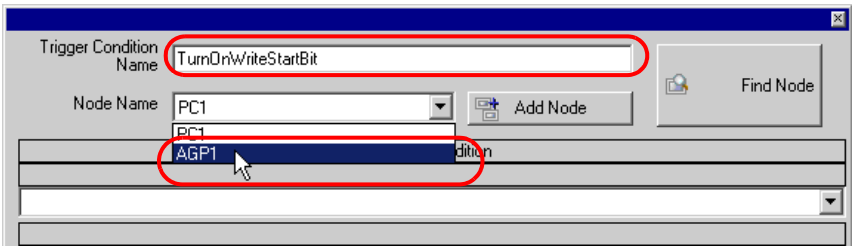
1 On the "Set ACTION Name/Parameter" screen, click the [Next] button.



2 Click the [New Trigger Condition] button.



3 Enter the trigger condition name "TurnOnWriteStartBit" in [Trigger Condition Name], and select "AGP1" in [Node Name] which has the device to serve as the trigger condition (trigger).

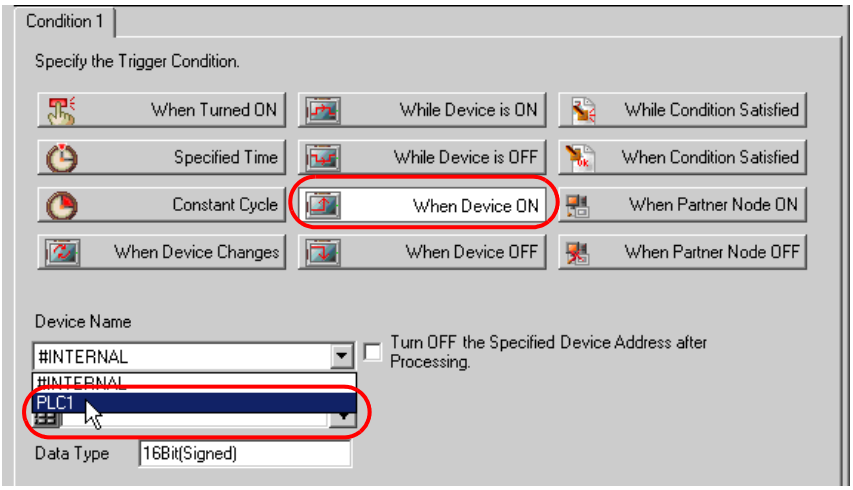


NOTE

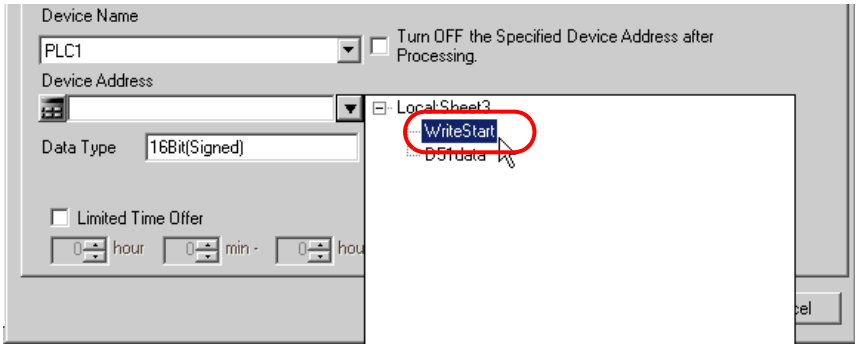
- Here, you are to specify the node having the device to be the trigger condition or having data to transfer.

  ☞ "33 Trigger Conditions"

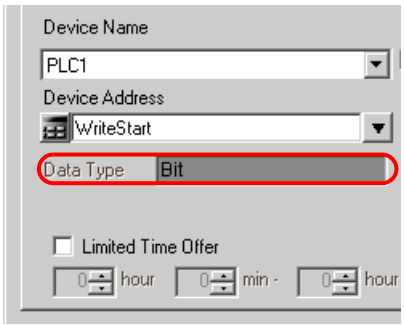
4 Click the [When Device ON] button in the [Condition 1] tab and select "PLC1" for the device name.



5 Click the [Device Address] list button and select "WriteStart" for the symbol name of the device which serves as the trigger.



[Data Type] automatically appears after selection, too.



NOTE

- You can also set trigger conditions by combining 2 different types of conditions ("And" condition or "Or" condition).

☞ "33 Trigger Conditions"

6 Click the [OK] button.

This is the end of trigger condition settings.

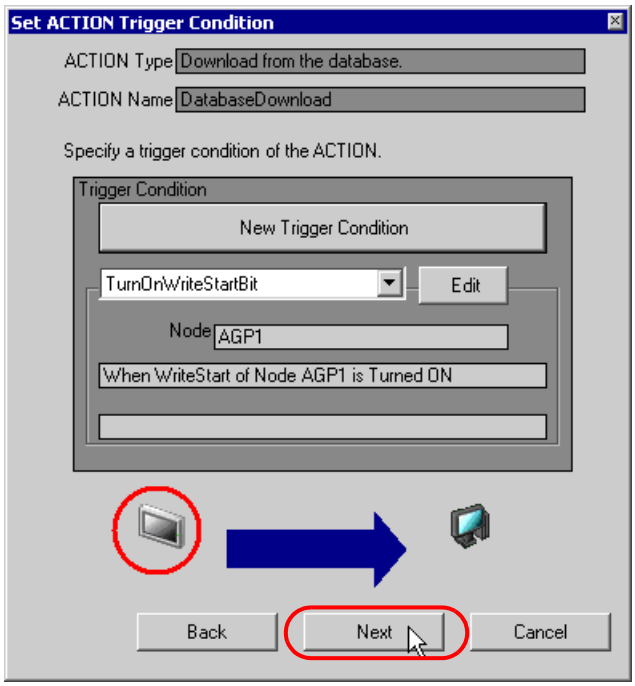
14.1.8 Setting Data Received by ACTION

This step sets a constant value (seqno) to be the sequence No. of a data table in ACTION .

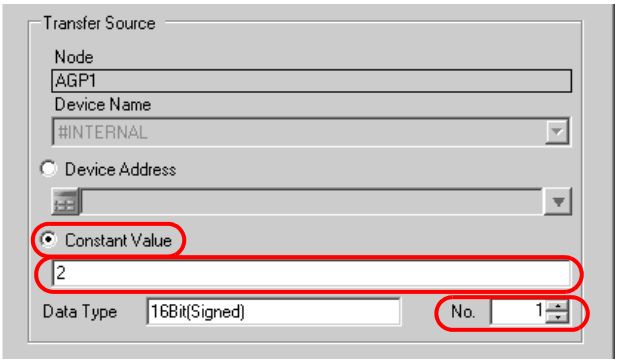
Ex.

- Constant value to transfer : 2

1 On the "Set ACTION Trigger Condition" screen, click the [Next] button.



2 After clicking [Constant Value], enter "2" in the text box for the constant value to transfer and "1" in [No.].



This is the end of the setting of data received by ACTION.

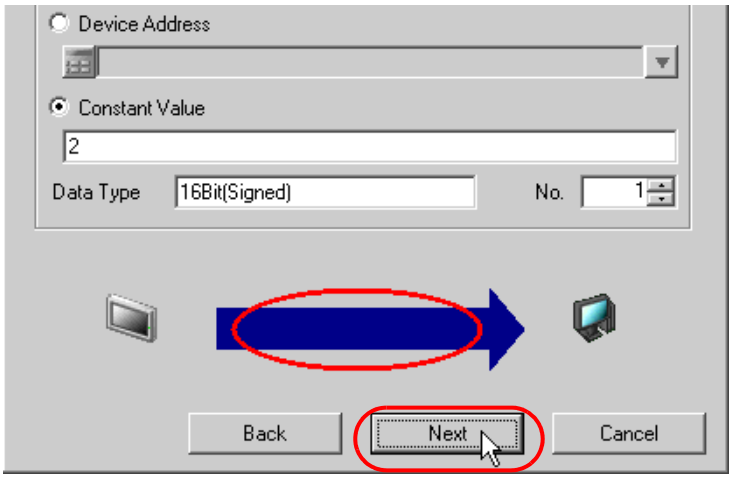
14.1.9 Setting ACTION Node/Process Completion Notification

This step sets the name of an ACTION node and the alert setting whether it should be tuned on or off when the ACTION is completed.

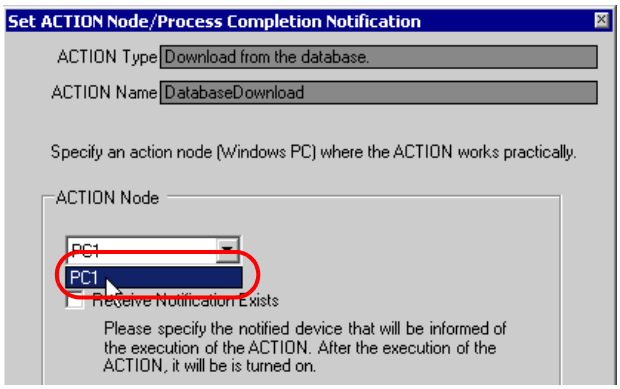
Ex.

- ACTION Node : PC1
- Receive Notification: OFF

1 On the "Data settings to be received by ACTION" screen, click the [Next] button.



2 Click the list button of [ACTION Node] and select "PC1" as a node where ACTION operates. Also, clear the check if [Receive Notification Exists] has been checked.



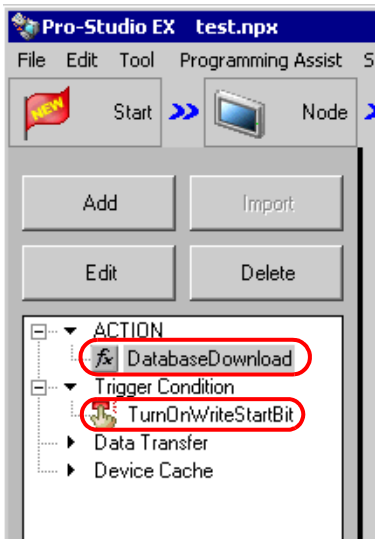
NOTE

- When "Receive Notification Exists" is turned on, the specified bit device will be turned on when the ACTION is completed. This can be used as the trigger condition (trigger) of the subsequent ACTION when you want to execute two or more ACTIONs sequentially.

☞ "33 Trigger Conditions"

3 Click the [Complete] button.

The "Set ACTION Node/Process Completion Notification" screen will disappear. On the left of the screen, the ACTION and trigger condition names you set will appear.

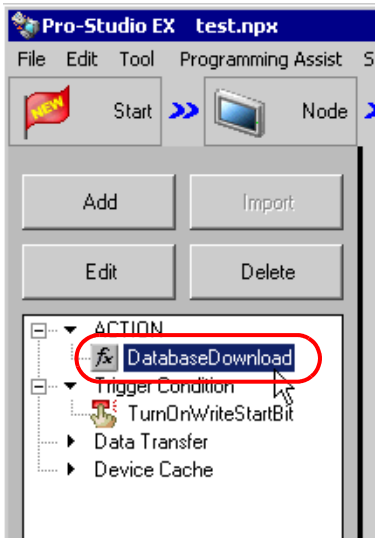


This is the end of the settings of the ACTION node and process completion notification.

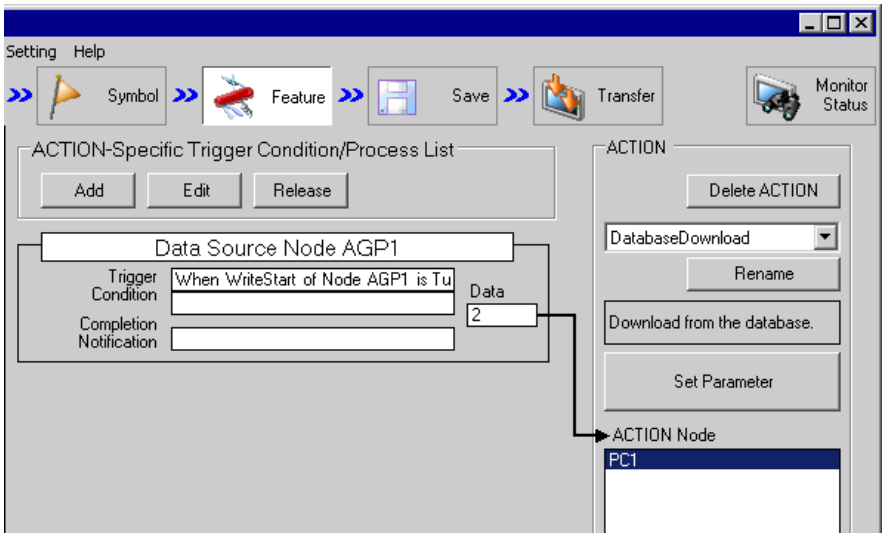
14.1.10 Verifying Setting Result

This step verifies setting results on the setting content list screen.

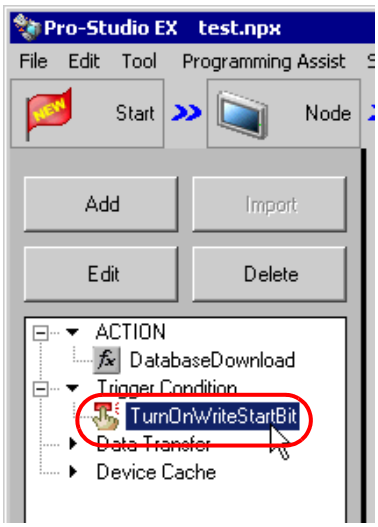
1 Select the ACTION name "Database Download" from the tree display on the left of the screen.



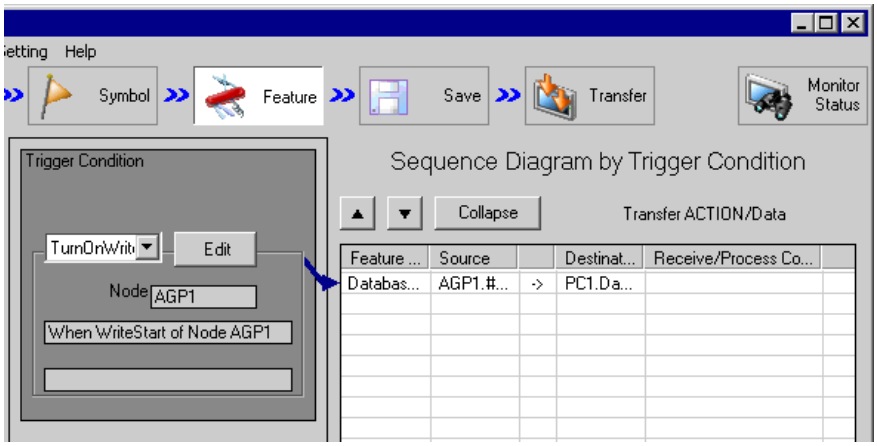
Confirm that the setting content appears on the right of the screen.



2 Select the trigger condition name "TurnOnWriteStartBit" from the tree display on the left of the screen.



Confirm that the setting content appears on the right of the screen.



This is the end of the verification of the settings.

14.1.11 Saving a Network Project File

This step saves the current settings as a network project file and reloads to 'Pro-Server EX'.

Refer to "25 Saving" for details about saving a network project file.

IMPORTANT
- 'Pro-Server EX' reads a created network project file, and then executes ACTION according to the settings in the file. The settings therefore need be saved in the network project file.
- Be sure to reload the network project file to 'Pro-Server EX'. If not, ACTION will not work.

Ex.

- Path of network project file : Desktop\Database_download.npx
- Title : Database download action

14.1.12 Transferring a Network Project File

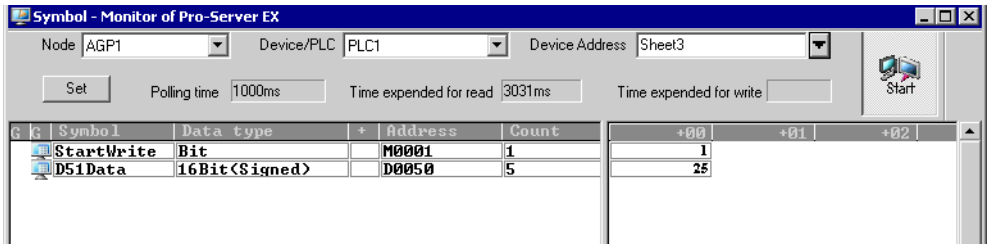
This step transfers a saved network project file to entry nodes.

Refer to "26 Transferring" for details about transferring a network project file.

NOTE
- Be sure to transfer a network project file. If not, ACTION will not work.

14.1.13 Executing ACTION

This step verifies that database data is written in the device of Device/PLC when the preset trigger condition has become effective.



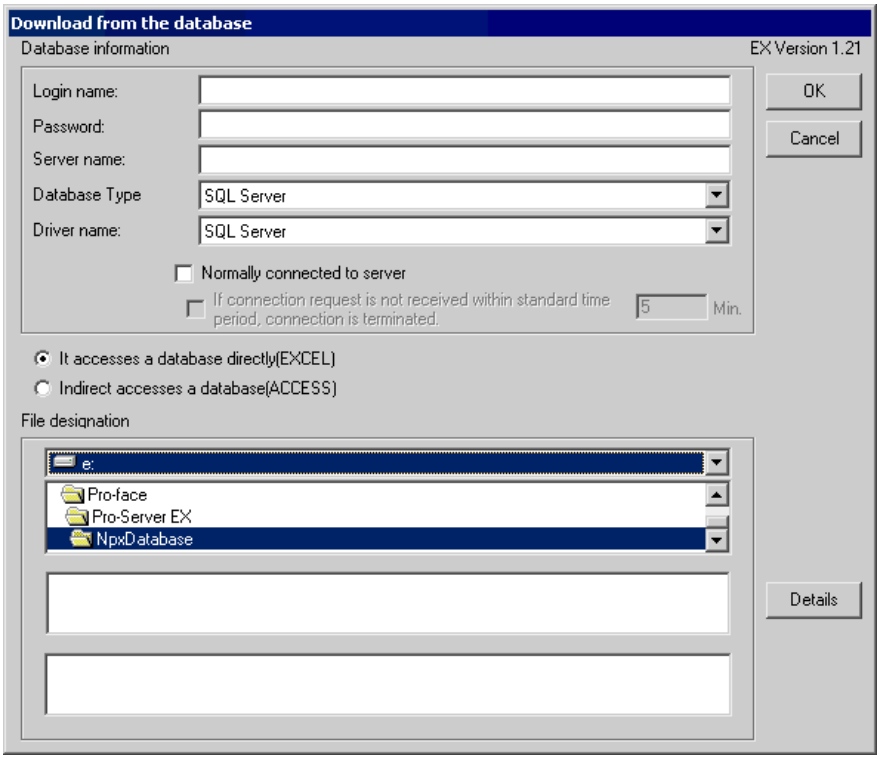
NOTE

- Check the actually written values with such function as monitor of rudder creation software.
- If you want to achieve faster communication during ACTION, refer to "29 Tips for Faster Communication".

This is the end of the explanation of this ACTION.

14.2 Setting Guide

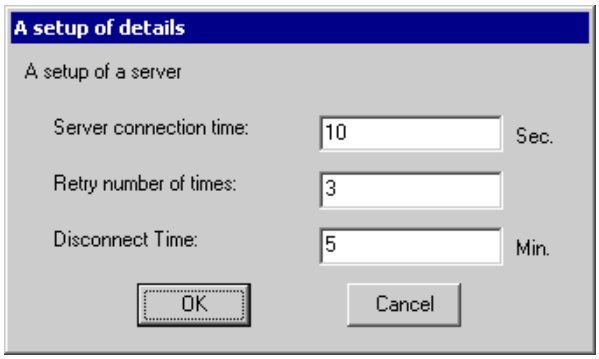
This section explains how to set the parameters of ACTION.



Setting item		Setting content
Database Information	Login name	Sets a login name to access the database server with.
	Password	Sets a password to access the database server with.
	Server name	Enters "PC Name" or "IP Address" of the database server. **NOTE** • If you select "DSN" in [Database Type], you do not have to enter this.
	Database Type	Selects a database type between [SQL Server], [Oracle], and [DSN].
	Driver name	Selects a driver depending on the selected database type. **NOTE** • If you select "DSN" in [Database Type], you do not have to enter this.

Setting item		Setting content
Database Information	Normally connected to server	Connects with the server at all times. **NOTE** • If you connect with the server frequently, an always-on connection is useful to reduce the time to open your database.
	If connection request is not received within standard time period, connection is terminated.	Disconnects when no connection is requested in a certain period in case of always-on connection to the server.
Database Access Method		Selects how to access databases. • It accesses a database directly (EXCEL) If you use Excel, database data is directly written into a device. • Indirect accesses a database (ACCESS) If you use Access, database data is once written into an Access file and then into a device.
File designation		Specify the save folder of the file including a table. C drive (C:) folder is to appear for initial setting. To change the drive to display, click the list button to select new one. After you specify the folder, select the file name from the list and the sheet name including a table.
[Details] Button		Clicking this button displays the "A setup of details" screen. Refer to "■ "A setup of details" Screen" Screen" for more details.

■ "A setup of details" Screen



Setting item		Setting content
A setup of a server	Server connection time	Sets communication time-out with the database server.
	Retry number of times	Sets the number of communication retries with the database server.
	Disconnect Time	Sets the time allowed until connection is cut if it has been set to disconnect when no connection is requested in a certain period.