# Chapte10. Library

By saving Function or Function Blocks as the files that can be used in a program, you can use them for your convenience. Sometimes you can create a new library file(defined by user).

## 10.1. Type of Library File

Library File consists of Function or Function Block.

Library File	Extension	Example
Function Library	. * FU	stdlib.3fu:standard function library for GM3
Function Block Library	.*FB	special.3fb:standard function block library for GM3

### Note

In .\*FU or .\*FB indicates the type of appropriate PLC in (In case of GM3, the type is.3FU)

Library is divided according to a use of file as below.

Library Type	Comment	Example
Standard Library	It is the files that collect basic functions/function blocks. (You can call it on the active program)	stdlib.*fu, stdlib.*fb
Exclusive Library	It is the files that collect the function blocks used in special/communication module(for A/D, D/A, Link),etc.(To add this libraries, select ' <b>Project-Insert Library</b> ' menu)	
Extensible Library	It is the files that supplied by manufacturer for the user using other LGPLC.(To add this libraries, select ' <b>Project-Insert</b> Library' menu)	
User defined Library	It is a library that user make personally.(It is added by 'Project-Insert Library' menu)	(User defined name)

## 10.2. Load a Library

## 1) Load of Standard Library

On the dialog box is appeared when you select **Project-Option Directory** in the menu, if you execute GMWIN program in the designated directory, standard library is loaded automatically.

• Select option item in Project menu.

<u>N</u> ew	
<u>O</u> pen	
Open <u>F</u> rom PLC	
<u>S</u> ave	
Save <u>A</u> s	
<u>C</u> lose	
Add Project Item	•
<u>E</u> dit Project Item	
<u>D</u> elete project Item	
<u>U</u> p(Program)	Ctrl+U
Do <u>w</u> n(Program)	Ctrl+₩
Edit M Region( <u>B</u> )	
Print	Ctrl+P
Printer Setup	
Option	
<u>L</u> ibrary Manager	
Insert Library	
Start Simulation	
1 c:₩gmwin₩source₩def000	00, prj
E <u>x</u> it	

• Select folders in **Option** dialog box.

Option	? ×
Make Option Monitor/Debug Option Auto Save Directory Set	Connect Option
c:\gmwin\lib	Search
Source File	
c:\gmwin\source	Search
Output File	
c:\gmwin\output	Search
_ Temp File	
c:\gmwin\temp	Search
J	
	OK Cancel Help

• Enter the path of library in Standard Library input text box of Directory Set menu. If you can't remember the path, select Search button where the library is in.

Browse for Folder	? ×
Directory Select	
E- 🐼 Desktop	
B-B My Computer	-
□ □ □ (C:)	- 10
🖨 🖨 GMWIN	
Output	
Temp	
I Isb	
Hicrosoft Office 2000	
📕 🛱 📥 Mu Documents	_
ОК С	ancel

◆ In case that the library is not in the selected director, the error message appear as below

Library F	ïle Load 🛛 🕅
8	Standart library is not exist at selected directory.
	[ОК]

#### Note

If there are no "stdlib.\*fu" and "stdlib.\*fb" (\*is the type of PLC. The type is stdlib.1fu for GM1) in the selected folder, an error message that cannot open appears when open a project. In this case, enter the folder correctly in **Project-Option-Directory Set** menu. Or copy the standard library to the selected folder.

2) Load a Exclusive, Extensible Library and the User defined Library

You can load selectively exclusive, extensible library and user defined library. In the state that project file is opened, call Include Library dialog box by selecting **Project-insert Library**.

#### Note

You can also call **Include Library** dialog box by double clicking after moving the mouse to a appropriate library item in library file list.

Add a desired library in Include Library dialog box, and click OK button.

c:\gmwin\lib\r c:\gmwin\lib\r c:\gmwin\lib\s			
	52	57	

Libraries supplied by manufacturer and User define libraries are appeared in the library list as the above dialog box. If you select a desired library and click **Add** button, then added libraries appear Current Included Libraries.

- (1) communi.3fb : Function blocks for the communication in GM3 (Cnet, Fnet, Mnet)
- (2) mkstdlib.3fu : functions for MASTER-K series
- (3) remote3.3fb:Function blocks for special modules in GM3(for REMOTE communication)

If you finish to add the libraries, added libraries appear on Project window.

📷 c∶₩gmwin₩source₩engine_line,prj	
PARAMETERS	-
BASIC PARAMETERS	
- I/O PARAMETERS	
LINK PARAMETERS	
INCLUDED LIBRARIES	
- 📑 c∶₩gmwin₩lib₩communi.4fb	
- <mark>≣</mark> c:₩gmwin₩lib₩mkstdlib.4fu	
└ <mark>╞</mark> с:₩gmwin₩lib₩special.4fb	
	-
<[	

When you add a library, If the item that selected in Library List is a standard library, the following error message appears.

Select L	ibrary 🗵
8	Standard libraries are already loaded.
	OK.

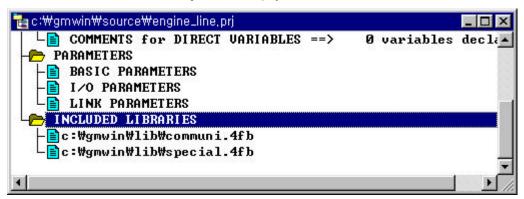
To delete the inserted library,

• In Current Included Libraries list box, select a desired library and click Delete button.

::\gmwin\lib\communi.4 ::\gmwin\lib\mkstdlib.4	
::\gmwin\lib\special.4fk	

Click **OK** button.

You can confirm whether the library is deleted on project screen or not.



## 10.3. Create User Defined Library File

Besides standard library or extensible library, you can create and use a program, which is for you convenience, like as Function/Function block.

#### 10.3.1. Create User Defined Function

- 1) Create a new Function Program
  - Select Program New program in the pull-down [1] menu.

rogram File Name : HIDE1 Language © <u>S</u> FC © LD © IL © FBD © ST	OK Cancel
Language © <u>S</u> FC © LD © IL © FBD © SI	
	Help
Function/Function Block Name : HIDE1 Return Data Type : INT	•

- Enter the name of function program to create with "\*.src" in Program File name box.
- In Language option radio button, select language type to use in editing the function.
- Select Function in Program kind option button.
- In Function/Function Block Name input text box, enter the function name to use in another program
- In Return Data Type list box, select the type of variable.
- If there is an additional comment for the function, enter the comments in Comments window.
- Click **OK** button and the following message appear

If you click Yes button, In/Out Variables List dialog box appears.

Editing F	Function/Func	tion Block			×
?	You'd better a	dding input/output varia	ables before ed	iting a F/FB program.	Do you want to add now?
		Yes	<u>N</u> o	Cancel	

• If you click No button In/Out Variables window for the selected language appears.

 <== Add VAR_INPUT	
<== Add <u>V</u> AR_IN_OUT	
Add VAR_OUTPUT ==>	
<u>E</u> dit	
 Delete	
 Up	
 Down	

2) Create Input Variable

• Differently from editing a Program Block, select Program-In/Out Variables to create variables.

<u>N</u> ew	Ctrl+N
<u>O</u> pen	Ctrl+O
<u>S</u> ave	Ctrl+S
Save <u>A</u> s	
Sa <u>v</u> e All	
<u>C</u> lose	
<u>P</u> roperties	
<u>L</u> ocal Variables	
In/Out Variables	S

• Add a variable in I/O variable input text box of In/Out Variables dialog box.

]	<== Add VAR_INPUT	
	<== Add <u>V</u> AR_IN_OUT	
	Add VAR_OUTPUT=>	
	Edit	
	Delete	
	Up	
	Down	

## Note

VAR\_IN\_OUT is distinguished from VAR\_IN by \* mark. Differently from VAR\_IN, VAR \_ IN\_OUT means that you can change the value of parameter taken from the side that call function / function block in that function / function block.

- (1) Add an Input / Output Variable
  - Click Add VAR\_INPUT, Add VAR\_OUTPUT, or Add VAR\_IN\_OUT button.

ariable Name :	INPUT1	OK
/ariable Kind :	VAR_INPUT	Cancel
Data Type		Help
Elementary :	INT	
C Array [0	JOF BOOL	
Z d dawakan aw aw	ay whose number of element is not	
determined.)		

- Add a desired input/output variable name in Variable Name input text box. (Maximum size of name is 8 characters)
- Select a variable type in Data Type list box.
- If you need a comment about input/output variable, enter the comment in **Comment** window and click **OK** button.

#### Note

If you fix an array number as-1, it means that the array number of input variable is fixed when call the function/function block.

(2) Edit an Input/Output Variable

- Select the item that you want to edit in In/Out Variables list.
- Click Edit button.
- Edit the content that you want to correct in dialog box and click **OK** button.

(3) Delete an Input/Output variable

- Select the item that you want to delete in In/out Variables list.
- Click **Delete** button.

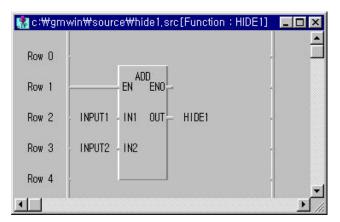
(4) Change the order of Input/Output variable

- Select the item that you want to change the order in In/Out variables list.
- Move the position of list by clicking Upward or Downward button as many as you want to move.

#### 3) Create a Function Program

- You can create a program with the same way of other program.
- But, to return the result of function' s calculation, an appropriate command to a name of function that was designated when created program is existed in Program.

i.e., If a name of function is ADD\_MUL in the outputted dialog box when select Program-Program Properties in the menu, the following command must be in the function program is creating.



4) Compile a Function Program

If you finish creating a program, make an execution file by selecting Compile-Compile in menu.

### Note

The object file is created after compiling a program. It has the extension of OF?. The execution code is changed according to a compiling on the project screen of PLC. ( If you create an object file on GM1, it is applicable to GM1 only )

#### 5) Function Wizard

If a compiling is finished without an error and warning, Wizard dialog box appears automatically to insert the compiled function into the library.

Fun/FB Wizard dialog box shows the various information for function/function block.

Fun/FB Wizard	×
Start Wizard of Fun/	/FB.
F/FB Name :	HIDE1
Type :	Function
Language :	LD
Src File Name :	c:\gmwin\source\hide1.src
Comment :	ASSEMBLY LINE FUNTION
< Bat	k. Next> Cancel Help

- If you select Cancel button, it stops inserting the compiled function into the library and project. If necessary, you can create a User Defined Library for the compiled function by selecting Project Library Manager. Similarly, you can also insert the compiled function into a project by selecting Project-Insert Library in menu
- If a compiling is finished with Warning messages, then the following message appears.

Function	/Function Block Compile 🛛 🔀
?	Warning messages are found during F/FB compiling. Do you want to ignore and continue?

• Click the Next button in Fun/FB Wizard dialog box.

<ul> <li>In Project</li> <li>New</li> </ul>	ſ	ASSEMB	LY .3fu	
• New • Maked		1		
		.3fu	Search	1
ontent of Selected				_

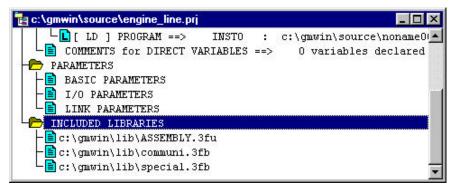
- ◆ In Library File Select, enter a new created library name in New input text box.
- If you want to insert a new created library form the user defined library that exists already in the project, click In Project button and select a desired library file.
- If you want to insert the library from the user defined library that does not exist in the project, select a desired user define library file after clicking Marked and Search.
- To call the 3<sup>rd</sup> dialog box, click the **Next** button.

, i	Address librar	y to proj	ect.		
1	Selection				
	Yes				
	C No				
1	1			 	

- In this Fun/FB Wizard dialog box, it determines whether you insert the library into a current project. If the library selected in the previous dialog box exists in the project, the project updates the file automatically.
   Click OK button and Next button. Then the following dialog box appears.

Fun/FB Wizard	×
Are you sure ?	
F/FB Name :	HIDE1
Type :	Function
Library Name 🗄	c:\gmwin\lib\ASSEMBLY.3fu
Src File Name :	c:\gmwin\source\hide1.src
Project Name :	c:\gmwin\source\def0000.prj
	÷
< <u>B</u> ack	Finish Cancel Help

Click Finish button, then the new library is added on the project window.



## Note

If you click the **Cancel** button on each step of Library Wizard, cancelled all the processing at this time. To add a selected content on the project, please click **OK** button in the 4<sup>th</sup> dialog box.

### 10.3.2. Create a User Defined Function Block

#### 1) Create a Function Block Program

• Select **Program-New Program** in menu. Then a new dialog box appears

ogram Properties		
Program Name :	assembly_fb.src	ОК
Language :	LD	Cancel
		Help
Program Kind		
C Program Bloc	k 💿 Function Block	C Function
Function/Functio	n Block Name : 🛛 🗍	SSEMBLY_FB
Re	tum Data Type : 🛛 📗	TT 💌
-Comments		

- Enter the Name of Function Block Program with \*.src to create in the column of Program Name.
- When you create Function Block, select the type of language to use in Language option button..
- Select Function Block in Program Kind option button.
- In Function/Function Block Name input text box, enter the function block name to be used in another program.
- Do not designate the type of variable to be reurn.
- Click **OK** button and the following message appears.

Editing F	unction/Functi	on Block				×
?	You'd better add	ling input/output varia	ables before ed	iting a F/FB progr	am. Do you want to add i	now?
		<u>Y</u> es	<u>N</u> o	Cancel	]	

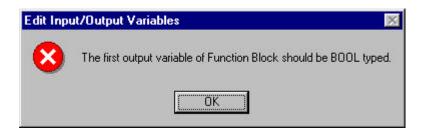
VAR_OUT:
<== Add VAR_INPUT
<== Add <u>V</u> AR_IN_OUT
Add VAR_OUTPUT==>
<u>E</u> dit
Delete
Up
Down

• If you click **Yes** button, In/Out Variables dialog box appears.

- If you click **No** button, edit dialog box for the selected language appears.
- 2) Create Input /Output Variable
  - Creating method is same as the creating of function. However, in function block there must be more than one input-output variable instead of variable to return.

/AR_IN/VAR_IN	L_OUT :	VAR_OUT:	
SWITCH1 SWITCH2	BOOL BOOL	<== Add VAR_INPUT MOTOR1 BOOL MOTOR2 BOOL	
		<== Add <u>V</u> AR_IN_OUT	
	[	Add VAR_OUTPUT==>	
		Delete	
		Up	
		Down	
(*: denotes W	AR_IN_OUT)		

- ◆ To insert input/output variable, use Add VAR\_IN or \_OUT... button.
- When you insert input/output variable, the first input/output variable must be Boolean type. If it is not a Booean type, an error message appears.

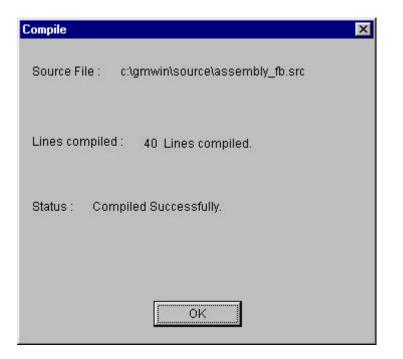


- 3) Create a Function Block Program
  - You can create a program with the same way of other program.

📳 c:\gmv	vin\source	\assembly_fb.src[Functi	on Block	C: ASSEME	SLY_FB]	- 🗆 ×
Row O	SWITCH1	1		ADD EN ENO		<u>^</u>
Row 1	SWITCH2	ADD ENO	A	INI OUT	A	
Row 2	Al	_ IN1 OUT A1	ı	IN2		
Row 3	ı	INZ				
Row 4	2					
Row 5		EN ENO			EN ENO	
Row 6	A	INI OUT MOTORI		Al	INI OUT MO	TOR2
Row 7	LIMIT	_ IN2		LIMITI	IN2	
Row 8	ļ				]	
						<u> </u>

4) Compile a Function Block Program

• If you finish creating a program, make an execution file by selecting **Compile- Compile(** ) in menu.



## Note

The object file is created after compiling a program. It has the extension of ".\*OB". The execution code is changed according to a compiling on the project screen of PLC. (If you create an object file on GM1, it is applicable to GM1 only)

5) Function Block Program Wizard

If the compiling is finished without an error and warning, Fun/FB Wizard dialog box appears automatically to insert the compiled function block into the library.

Fun/FB Wizard	×
Start Wizard of Fun	/FB.
F/FB Name :	ASSEMBLY_FB
Type :	Function Block
Language :	LD
Src File Name :	c:\gmwin\source\assembly_fb.src
Comment :	FB FOR ASSEMBLY LINE
	ok. [Next>] Cancel Help

- If you select Cancel button in the above box, it stops inserting the compiled function block into a library and project. If necessary, you can make a User Defined Library for the compiled function block by selecting Project-Library Manage.
- ♦ If the compiling is finished with warning, the following message appears. This message asks whether you continue the function program wizard after correcting the warning.
- The first dialog box of function program wizard shows various information.

Click Next button in the first dialog box of the function program wizard.

Fun/FB Wizard	د
Select Fun/FB for addressir	ng to library.
Library File Select	1
🔿 In Project	<u>×</u>
C New	ASSEMBLY1 .3fb
C Maked	
	.3fb Search
Content of Selected Librar	IV
	<u> </u>
1	J
< <u>B</u> ack	Next > Cancel Help

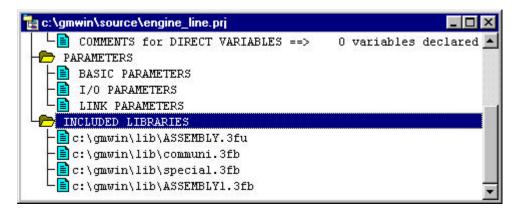
- In Library File Select of Fun/FB Wizard dialog box(the second dialog box), enter new created library name in New input text box.(GM3\_FB1)
- If you want to insert new created library into user defined library that exists already in project, click In Project button and select a desired library file.
- If you want to insert the library into user defined library that does not exist in the project, select a desired library file by clicking Made button.
- If you finish selecting a file, click **Next** button.

un/FB	₩izard			
	Address I	ibrary to pr	niect	
	110010001	, to p.	.,	
	_ Selectio	n		
	۰Y	es		
	C N			
	5 N	10		
		352		

- In this Fun/FB Wizard dialog box, it is determined whether you insert the library, which has function block, into the current project. If the library selected in the previous dialog box exists in project is update automatically. In case of insert the function block into a new library file, it is optional to insert in project
- Select Yes button and press Next button. Then the Fun/FB Wizard dialog box appears.

Are you sure ?	
F/FB Name :	ASSEMBLY_FB
Type :	Function Block
Library Name:	c:\gmwin\lib\ASSEMBLY1.3fb
Src File Name :	c:\gmwin\source\assembly_fb.src
Project Name :	c:\gmwin\source\engine_line.prj

• Click Finish button, then a new User FB library appears on the project screen.



# 10.3.3. Library Manager

In Library Manager, you can create and edit library file that is not concerned with project.

<u>N</u> ew	
<u>0</u> pen	
Open <u>F</u> rom PLC	
<u>S</u> ave	
Save <u>A</u> s	
<u>C</u> lose	
Add Project Item	•
Edit Project Item	
<u>D</u> elete project Item	
Up(Program)	Ctrl+U
Do <u>w</u> n(Program)	Ctri+W/
Edit M Region( <u>B)</u>	
<u>P</u> rint	Ctrl+P
Printe <u>r</u> Setup	
Option	
Library Manager	
Insert Library	
Start Simulation	
<u>1</u> c:\gmwin\source\engine_	line.prj
E <u>x</u> it	

1) Create a Library File

• To call the Library Manager dialog box, select Project-Library Manager in menu.

ibrary File Select	
File Name : <not selected=""></not>	Close
Select <u>N</u> ew	Print
un/FB List(0) :	Help
<u>A</u> dd <u>D</u> elete <u>U</u> pdate	
I/FB Contents	
Comments : <no></no>	
<u>*</u>	

• To call the Make New Library File dialog box, click New in the Library Manager dialog box.

Enter name of new library ile :	Library Type	ОК
(except extension)	C Fun	Cancel
ASSEMBLY .3FB	● FB	Help
-Target PLC C GM <u>R</u> C GM <u>1</u> , 2	• GM <u>3</u> • GM <u>4</u>	GGM <u>5</u> CGM
-Target PLC	© GM <u>3</u> ⊂ GM <u>4</u> (	
Target PLC C GM <u>R</u> C GM <u>1</u> , 2	© GM <u>3</u> ⊂ GM <u>4</u> ( [] [-a-]	

- Enter a library file name.( less than 8 characters)
- With library type option button, you can select the type of library to create newly.
- With objective PLC option button, select a PLC to which the library is applied.
- Select a directory in where the library file will be. At this time, it is important to input the same directory that fixed in Directory of Library file of option.
- Click **OK** button and library manager dialog box appears.

Library Manager	×
Library File Select	Close
File Name : C:\GMWIN\LIBVASSEMBLY.3FB	
<u>S</u> elect	Print
Fun/FB List(0):	Help
Add Delete Update	
Fun/FB Contents	
Comments : <no></no>	

- 2) Select a Library File
  - Click Select button in Library Manager dialog box.

Library File Selectio	n		? ×
Look jn: 🔂 Lib		- 🗈 💋 🖞	¥ 🔳
ASSEMBLY.3FB ASSEMBLY.3fu ASSEMBLY1.3fb Comm.7fb COMMUNI.1fb COMMUNI.3fb	COMMUNI.4fb COMMUNI.5fb COMMUNI.6fb COMMUNI.6fb COMMUNI.Rfb MKSTDLIB.1fu mkstdlib.3fu	<ul> <li>mkstdlib.4fu</li> <li>mkstdlib.5fu</li> <li>mkstdlib.6fu</li> <li>mkstdlib.7fu</li> <li>Mkstdlib.7fu</li> <li>MKSTDLIB.Rfu</li> <li>REMOTE3.1fb</li> </ul>	REMOTE: REMOTE: REMOTE: REMOTE4 REMOTE4 REMOTE4
	<mark>/BLY.3FB</mark> File(*.*f*)		<u></u> pen Cancel

- After selecting the library file that you want to edit, click **Open** button
- Then the entire function/function block in selected library file appears automatically in **Fun/FB List**.

Library Manager	×
Library File Select File Name : C:\GMWIN\Lib\ASSEMBLY1.3fb Select New Fun/FB List@ :	Close Print Help
ASSEMBLY_FB assembly_fb.src 1999.12.16 14:20:10 Add Eun/FB Contents Comments : FB FOR ASSEMBLY LINE	
ASSEMBLY_FB BOOL · SWITCH1 MOTOR1 BOOL · SWITCH2 MOTOR2 · BOOL · WITCH2 · WOTOR2	

If you select a desired Fun/FB in the Fun/FB list, the content of selected Fun/FB is appeared on the Fun/FB Contents.

- 3) Add a Function/Function Block Object File
  - Enter Function/Function Block File to add in Add Function/Function Block dialog box and click OK button.
- 4) Delete a Function/Function Block Object File
  - In Fun/FB List in Library of Library Manager dialog box, select function/function block that you want to delete and click Delete button.
- 5) Update a Function/Function Block Object File
  - In Fun/FB List in Library of Library Manager dialog box, select function/ function block that you want to update and click Update button.