Table of Contents

Prefa	ce	1
Macr	o Editor	2
De	escription on the Interface	2
	a. Script Clearing	
	b. Script Reading	4
	c. 星 Script Saving	5
	.d. 🎽 .Cut	5
	e. La Copy	5
	f. Paste	
	g. Search	
	h. a Rung number	
	i. Syntax Analysis	
	j. Automatic Syntax Analysis	8
	k. W Help	8
Fu	unction Window	9
. •	a. Toolbox	
	b. Search	
Ec	diting Window	
	a.ID: 0000	1/1
	b. Help	15
	c. Communication Port	17
	at sub full continues	10
	e. Numeric Mode	
	f. 5. Triggering Setup	
	g. enlarge script area	
_	h. languar Device	
	ror Window	
ın	troducing the Basic Commands	
	a. Operation Description	
	b. Device Usage	
	c. Process Control	
	d. Function	Zŏ

e. arithmetic function		30
Appendix A	General Practice	1
Interlock K	Keys:	<u>A-1</u>
Criteria Se	lection for Export	<u>A-4</u>
sub-functi	on	A-7



Preface

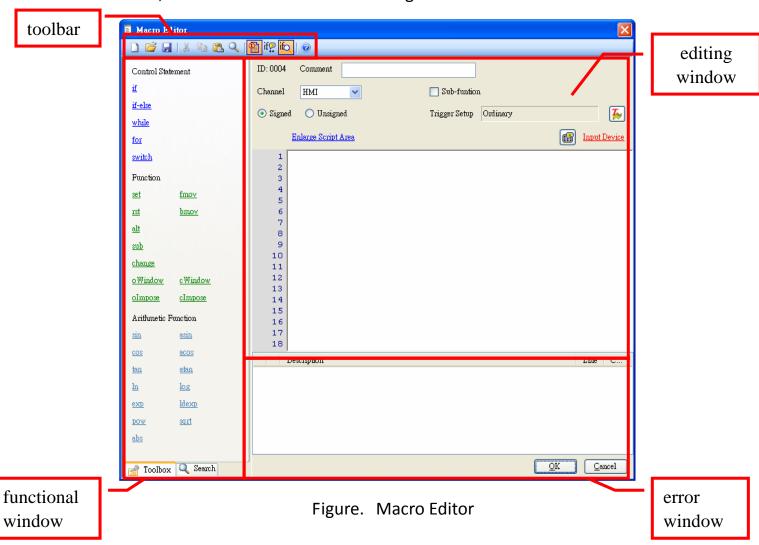
Macros are a simple programming language that enables the user to write their own programs for specific functions. The main purposes of macro are for automation or for triggering other functions according to certain criteria. For those who are familiar with programming language can effective take advantage of human and machine interface register and save time on screen editing.



Macro Editor

Interface Description

Click <u>Create</u> to open the macro editor from the Macro Library. The editing screen consists of a toolbar, a functional window, an editing window, and an error window. See the figure below.



Toolbar

All the functions provided by the toolbar are listed in the following table.

Figure. Toolbar Function Description



Name	Function
	Clearing out macro data from the editing window
=	Reading the script from the file
	Saving macros into the file
X	Cutting the selected macro
	Copying the selected macro
re-	Pasting the cut or copied
	macro
	Searching data inside the
~	editing window
Ø6	Opening /closing row number
*	displ <mark>ay</mark>
if 💯	Run <mark>syn</mark> tax analysis
16-	Opening / closing the
~	auto <mark>ma</mark> tic syntax analysis
(A)	Op <mark>enin</mark> g the online PDF Help
	file

a. Script Clearing

Click in from the toolbar to delete all the edited data from the screen to complete the initialization of the macro editor.

b. Script Reading

Click from the toolbar to open the to be read data file (*.txt). See the figure below.

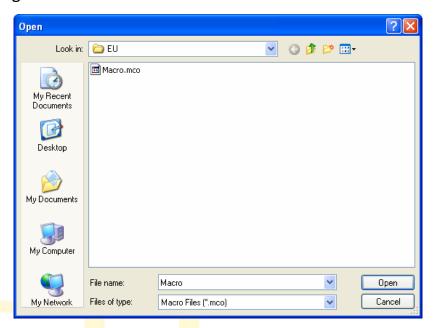


Figure. Script Reading



c. Script Saving

Click I from the toolbar to save the macro data from the editing screen into a file (*.txt). See the figure below.

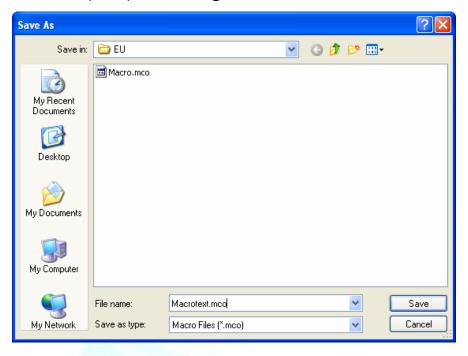


Figure. Script Saving

d. Cut

Select the cutting range, and either click from the toolbar or press the hotkey Ctrl+X to cut the selected macros.

e. Copy

Select the copying range and either click from the toolbar or press the hotkey Ctrl+C to cut the selected macros.

f. Paste

To paste a copied or cut macro, choose from the toolbar, or press Ctrl+V.

g. Search

To search macro data in the editing screen, click from the toolbar to change from the toolbox to the search tab or directly click to carry out tab switching. See the figure below.

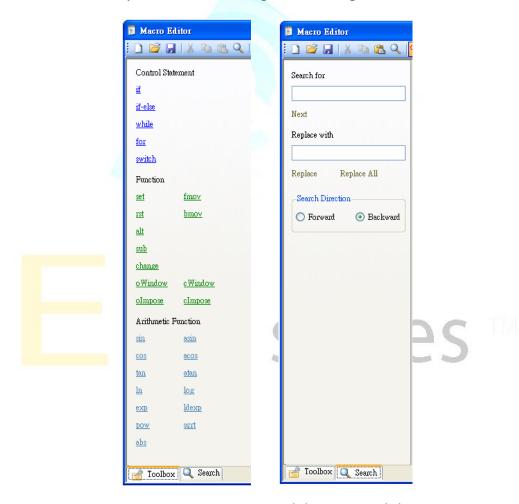


Figure. Functional Window: (a) Toolbox; (b) Search

h. <a>¶Rung Number

The rung number displayed at the side of the editing window enables the user to juxtapose it with the macro rung number. Click from the toolbar to open/close the rung number display. See the figure below.



Figure. Rung Number Display: (a) Displaying Rung Number; (b) Hiding
Rung Number

i. Syntax Analysis

To check if the macro syntax in the editing screen is correct or not, click from the toolbar for the analysis function. The result will be displayed at the Error window. See the figure below.

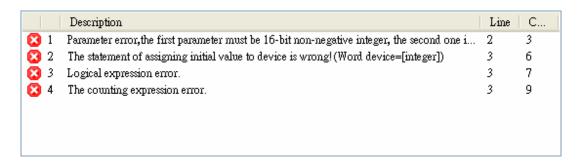


Figure. Syntax Analysis error window

i. Auto Syntax Analysis

When writing macros in the editing screen, the system will run automatic syntax analysis and display the result at the bottom of the screen. The default setting of this function is ON.

k. Help

Click from the toolbar to open the instruction manual (PDF file).

Use Adobe Acrobat Reader software to read the manual.



Function Window

The macro editing function window provides a toolbox and a search tab, which can be modified according to the requirement of the user. The user can also directly click or Seems to change tab.

See the figure below.

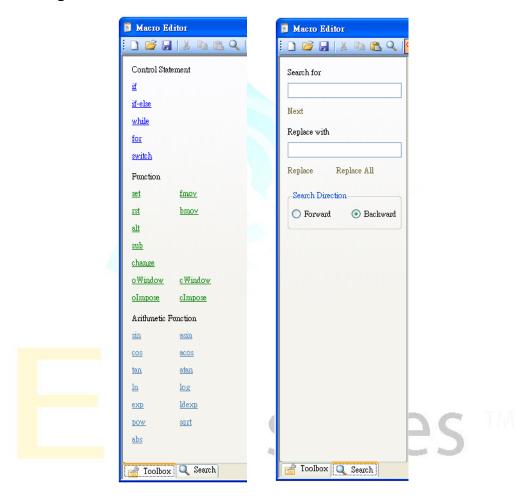


Figure. Functional Window: (a) Toolbox; (b) Search

a. Toolbox

The toolbox provides syntax that can be used by editing macros. The user directly clicks on the required syntax, which will be automatically transferred to the editing window. See the figure below.

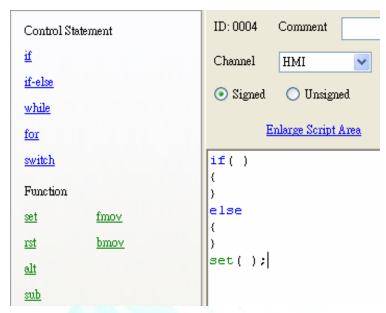


Figure. Set up Syntax Function



b. Search

To search macro data in the editing screen, click \P from the toolbar to change from the toolbox to the search tab or directly click

Search to change tab. See the figure below.

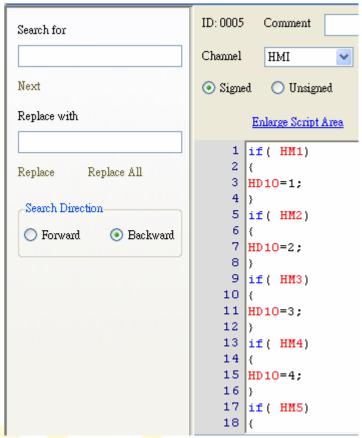


Figure. Search Function

series **

The user only needs to enter the to be searched text into the box and click Next to carry out the search. See the figure below.

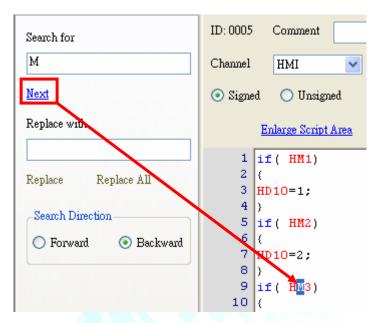


Figure. Search Target

NOTE

Please note that absolute upper or lower cases are required for macro editing, or otherwise a warning window will pop out to remind the user. See the figure below.



Figure. Warning Window

First, enter the to be replaced text into the box and click Next to carry out the search. Next, click Replace or Replace All for the replacing action. See the figure below.

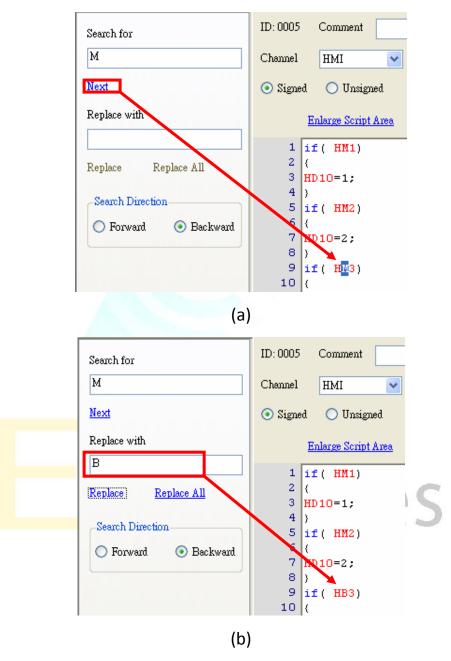
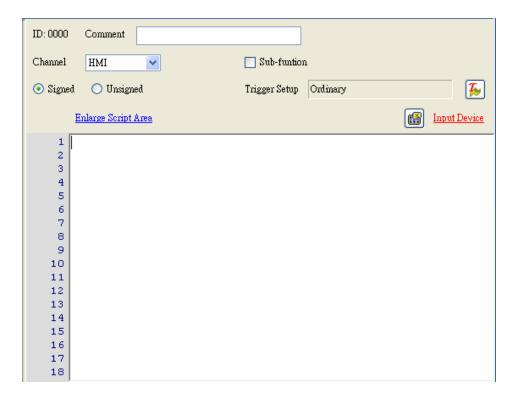


Figure. Search Function: (a) Search; (b) Replace

Editing window

The macro editing window of the macro editor enables the user to make modifications on ID descriptions, to write macro syntax, and to arrange subroutines and the triggering setup. See the figure below.



None	5
Name	Function
ID: 0000 Comment	Editing macro descriptive name
Channel	Changing the control communication port
✓ Sub-funtion	Setting as a subroutine
Signed Unsigned	Changing data mode
Trigger Setup	Setting up macro triggering criteria
Enlarge Script Area / Display Setting	Enlarging/returning to the editing window
Input Device	Selecting the input device

Figure. Editing Screen

a. ID: 0000

ID: 0000 is the code of the macro that means the user is currently editing. See the figure below.

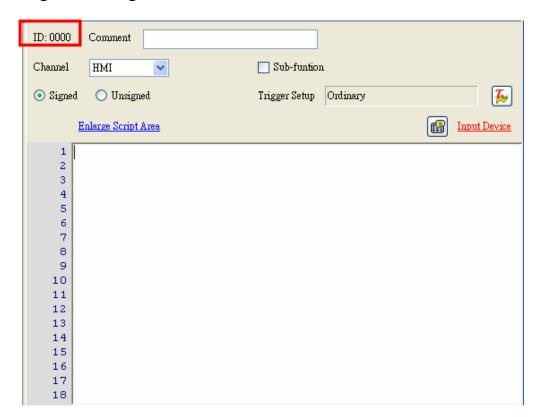


Figure. ID Code



b. Comment

To make modifications on the content of the description, the user can edit the required text in the description box, which will make later viewing more convenient. See the figure below.

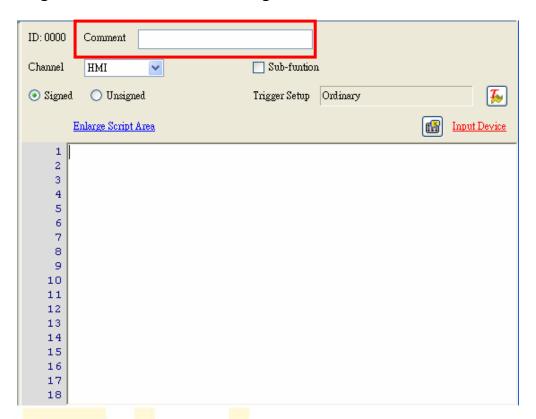
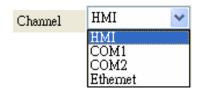


Figure. Description on Modifications



c. Cannel

To set up communication port devices, use the pull-down menu to select the required communication port device. See the figure below.



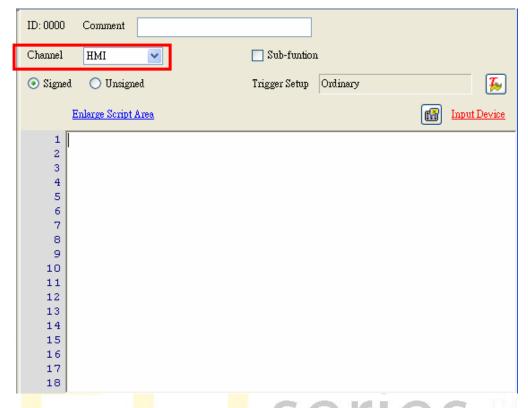


Figure. Changing Communication Port

NOTE

One set of macro editor can carry out macro editing for only one device with the human machine interface.

d. Sub-funtion

Select Sub-funtion from the macro editor to change macro programs to sub-funtion. The macro library will display these programs as sub-funtion. When a macro is a sub-funtion, the user needs to use command to call and to run a sub-funtion. See the figure below.

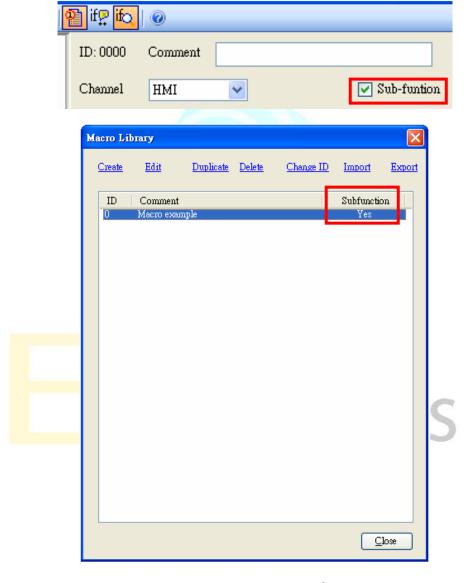
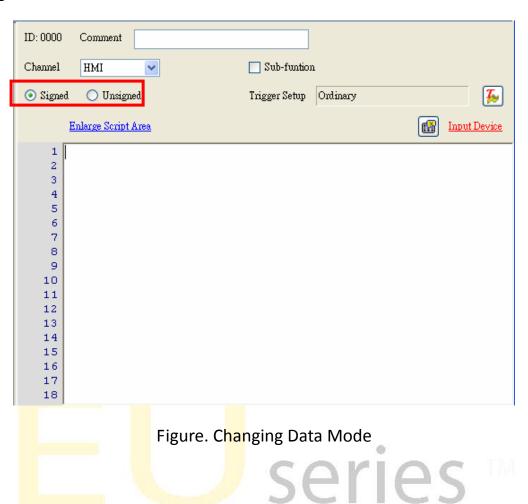


Figure. Setting up a sub-funtion

e. Data Mode

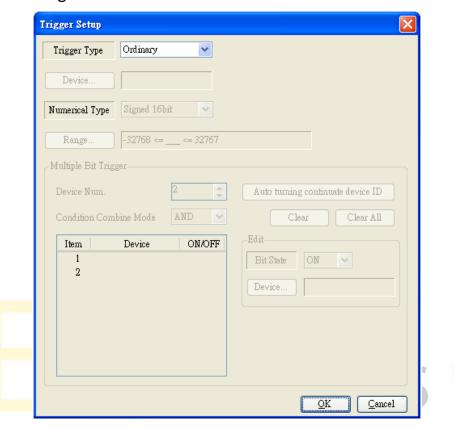
To change the data mode of a device from with signed to unsigned or vice versa, select Signed or Unsigned accordingly. See the figure below.



f. Triggering Setup

When selecting the triggering mode, the program will run the macro according to the triggering criteria. If the user chooses no effect for the triggering mode, the macro will be run continuously.

To set up macro trigger criteria, click to open the *Trigger Setup* window. From there, the user can modify the trigger mode and the criteria. See Figure 3-4-28 below.



Triggering Mode	Description	
Ordinary	No Triggering Mode	
ON	Delivering actions only when the device is ON	
OFF Delivering actions only when the device is OFF		
Pango	Delivering actions only when the value of the device	
Range	is within this range.	
Multiple bit	Delivering actions only when all the devices (more	
Trigger than two) have met the criteria.		

Figure 3-6-216 Descriptions on the Triggering Mode Setup



The *Triggering Mode Setup* has multiple bit trigger and 2 number of devices. Click Device... to open the *Device Setup* window, and set the triggering devices as M1 and M2, respectively. Press *OK* to send the files to HMI. Button pressing would trigger further actions only when M1 and M2 buttons are both ON. See Figure 3-6-294 below.

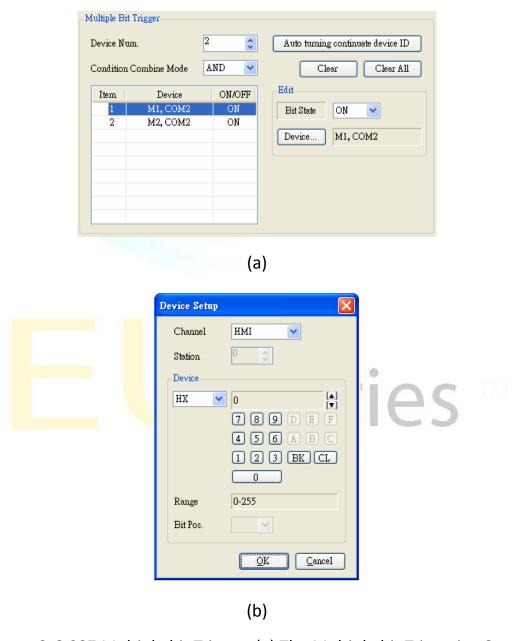


Figure 3-6-237 Multiple bit Trigger: (a) The Multiple bit Triggering Setup
Window; (b) Setting up the Devices

g. Enlarge Script Area

To enlarge the script editing screen, click Enlarge Script Area to enlarge the editing screen and extend the screen toward the top of the screen. Next, click Display Setting to return to the original state. See the figure below.

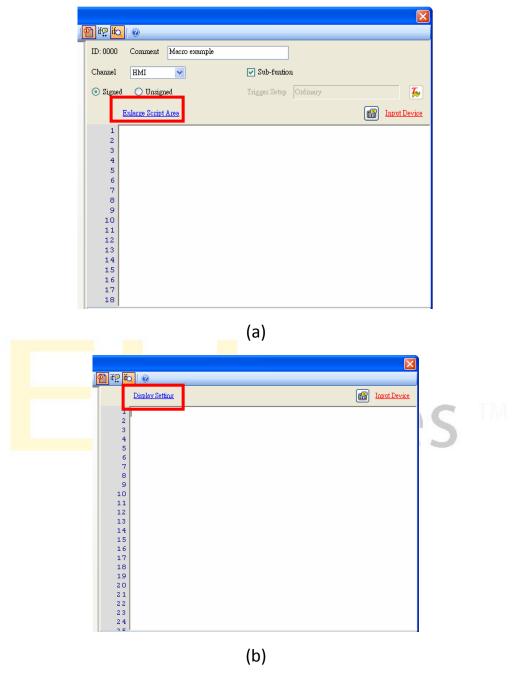


Figure. Editing Screen: (a) Enlarge Script Area; (b) Display Setting

h. Input Device

For device installation, click 15 to open the *Device Setting* dialog box. From there, the user can modify the device mode. After selecting the mode, click 15 again to open the *Device Setup* dialog box. Press *OK* to complete the setup. See Figure 3-4-29.

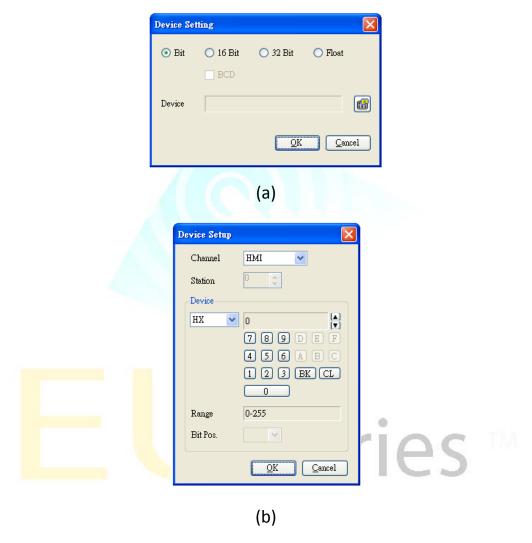


Figure 3-4-29 Input Devices : (a) Setting up the Format; (b) Setting up the Device

Error Window

Error window is available for carrying out syntax analysis when editing macro programs in order to ensure the correctness of the program. The user can make correction according to the message described in the error window. See the figure below.

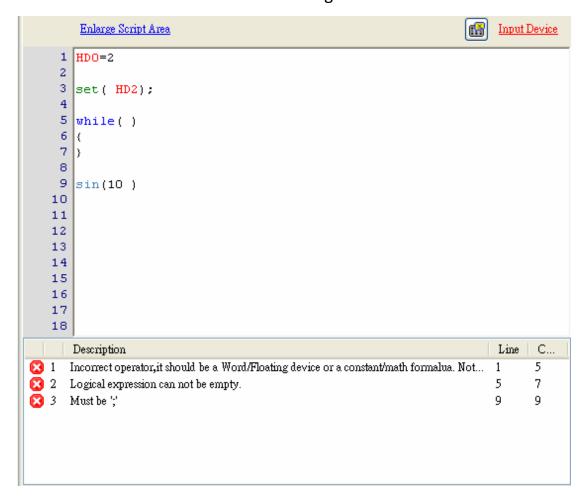


Figure. Error Window

Introducing the Basic Commands

a. Operation Description

Click *Syntax* in the function window to have it moved to the editing window directly. Programming language and devices are presented in the corresponding colors. The macro program will be run repeatedly. See the figure below.

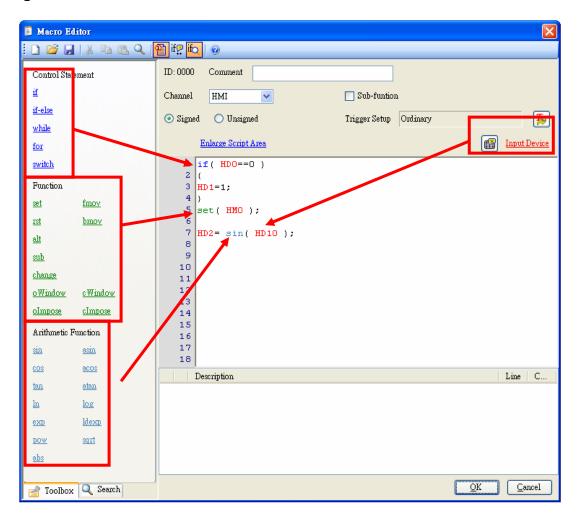


Figure. Operation Description

b. Device Usage

Macro editing follows the general programming language with internal syntax rules. The user can freely change the devices, the operational symbols, and the conditionals. A more detailed description is provided in Table 3-4-24 below Figure. Description on Syntax Rules, Operational Symbols, and Conditionals

Device Syntax: Station Number, 32 bit, Float, Word Device, Bit Device

Device	Example Description		
	M0	Using general bit	
	D. M0	Using bits as words	
	W.D. M0	Using bits as 32 bit words	
Bit	1. <mark>M0</mark>	Assigning PLC station code using general bit	
	1.D. M0	Assigning PLC station code using bits as	
	A TAN	words	
	1.W.D. <mark>M0</mark>	Assigning PLC station code using bits as	
	A 10	32-bit words	
	D0	Using general bit	
	W. D0	Using bits as 32-bit words	
	D0 .01	Using words as bits	
Word	1. D0	Assigning PLC station code using general words	
55514	1.W. D0	As <mark>sig</mark> ning PLC station code using 32-bit words	
	1. D0 .01	Assigning PLC station code using words as	
		bits	
	F.DO Real floating points		
Operational Symbol	+,-,*,/,%,&, ,<<,>>		
Conditional	== , != , < , > , <= , >= , && ,		

NOTE

Apply real float points as the device for calculating the data if mathematical functions are used.

c. Control statement

Detailed statement control commands are described in the table below.

Figure 3-4-24 Descriptions of the Statement Control Commands

Statement Control	Command Function	Example	Action Description
if	Execute if condition holds; Do not execute if condition does not hold;	if (HD0==0) { HD1=1; }	If HD0=0, HD 1=1
if-else	If condition holds, Excute the true statement; If condition does not hold, Excute the false statement;	<pre>if (HD0==0) { HD1=1; } else { HD1=0; }</pre>	If HD0=0, HD 1=1 If HD0≠0, HD1=0
while	Execute if condition holds; Stop if condition does not hold;	<pre>while (HD0==0) { HD1=HD1+1; }</pre>	When HD0=0, HD1=HD1+1 When HD0≠0, stop
for	After determining the condition holds, add value accumulatively to the original value.	<pre>for (HD0=0; HD0<3; HD0++) { HD1=HD0; }</pre>	For HD0<3 , HD0=HD1 The values of HD0 are $0\rightarrow1\rightarrow2\rightarrow3$ The values of HD1 are $0\rightarrow1\rightarrow2\rightarrow3$
switch	The acquired values, should match the corresponding cases.	<pre>switch(HD0) { case 1: HD1=1; break; case 2: HD1=2; break; }</pre>	If HD0=0, HD 1=1 If HD0=2, HD 1=2

Function

More detailed function commands are described in Table 3-4-25 below.

Figure 3-4-25 Descriptions of the Function Commands

Function	Command Function	Example	Action Description
set(B)	Frequently turning on the bit device	set(HMO);	HM0=ON
rst(B)	Frequently closing the bit device	rst(HMO);	HM0=OFF
alt(B)	Alternating between the ON and OFF of the bit device	alt(HMO);	HMO alternates continuously.
sub(W/Z)	Calling subroutine	HD0=3; sub(HD0); sub(3);	Subroutine calling for ID#3.
fmov(Z,W,Z)	Multicast Values	fmov(123, HD0, 2);	Transfering numeric value 123 to HD0 and HD1.
bmov(W,W,Z)	Batch transmitting values	HD0=123; HD1=456; bmov(HD0,HD10,2);	Transmitting HD0=123 to HD10 Transmitting HD`=456 to HD11
delay(W/Z)	delay the user setting time	HDO=1000; delay(HDO); delay(1000);	Delay 1000 ms o (Remark 2)
change(W/Z) Changing the base screen		HD0=3; change(HD0); change(3);	Skipping to main screen No.3
Note	1. B: Bit device, W: Word device, N: value of 1 or 2, Z: positive integer 2. After Delay command is executed, HMI will stop the operation. The operation will resume after the delay time has elapsed.		

Figure 3-4-25 Descriptions of the Function Commands

Function	Command Function	Example	Action Description
oWindow(N,W/Z)	Opening overlap window N of code Z screen	<pre>HD0=3; oWindow(1,HD0); oWindow(1,3);</pre>	Opening overlap screen 1 of code 3 screen
cWindow(N,W/Z) Closing overlap screen N		<pre>HD0=4; cWindow(2,HD0); cWindow(2,4);</pre>	Closing overlap screen 2 of code 4 screen
olmpose(N,W/Z)	Opening superimpose screen N of code Z screen		Opening superimpose screen 1 of code 3 screen
cImpose(N,W/Z) screen N cImpose (2, HD0); screen 2		Closing superimpose screen 2 of code 4 screen	
Note	B: Bit Device; Q: Word Device; N: numerical of 1 or 2 (1 或 2 的數值); Z: Positive integral		



e. Arithmetic Function

More detailed function commands are described in the table below.

Figure. Description on Arithmetic Function Commands

Arithmetic Function	Command Function	Example
sin(W/R)	Get positive sine of x	HD0=10; HD1=sin(HD0); HD1=sin(10);
cos(W)	Get positive cosine of x	HD0=10; HD1=cos(HD0); HD1=cos(10);
tan(W)	Get positive tangent of x	HD0=10; HD1=tan(HD0); HD1=tan(10);
asin(W/R)	Get asin(X)	HD0=10; HD1=asin(HD0); HD1=asin(10);
acos(W)	Get acos(X)	HD0=10; HD1=acos(HD0); HD1=acos(10);
atan(W)	Get atan(X)	HD0=10; HD1=atan(HD0); HD1=atan(10);
Note	W: Word Device	

Figure. Description on Arithmetic Function Commands

Arithmetic Function	Command Function	Example	Action Description
In(W/X)	Get In(X)	HD0=5; HD1=ln(HD0); HD1=ln(5);	HD1=ln5
log(W/X)	Get log(X)	HD0=5; HD1=log(HD0); HD1=log(5);	HD1= log ₁₀ 5
exp(W/X)	Exp(X)	HD0=5; HD1=exp(HD0); HD1=exp(5);	HD1=e ⁵
ldexp(W/X,W/Y)	Get X * 2 ^Y	HD0=5 HD1=10; HD2=ldexp(HD0, HD1); HD2=ldexp(5,10);	HD2=5*2 ¹⁰
pow(W/X,W/Y)	Get X ^Y	HD0=5 HD1=10; HD2=pow(HD0, HD1); HD2=pow(5,10);	HD2=5 ¹⁰
sqrt(W/X)	Get the square root of X	HD0=5; HD1=sqrt(HD0); HD1=sqrt(5);	HD1=√5
abs(W/X)	Get the absolute value of x	HD0=-5; HD1=abs(HD0); HD1=abs(-5);	HD1= -5 =5
Note W: Word Device; X and Y: Integrals			



In the case when math functions from the macro editor are used to calculate $\sqrt{3^2}$ =3, for which the actual answer from the calculation is 3, but device setup will affect the displayed data. In this case, one should use the real float point device to run the math function computation. The highest accuracy of float point device is five digits after the decimal point. See the table below for more details.

Figure. Description on Device Setup

<pre>Device1=sqrt(Device2); Device2=pow(3,2);</pre>					
State	Device1	Device2	Result		
1	HD0	HD2	0		
2	HD0	F.HD2	0		
3	F.HD0	HD2	3		
4	F.HD0	F.HD2	3		

series



The PLC brands supported by Macro commands fmova and bmov are listed in the following table.

Figure. PLC Series Supporting Brands

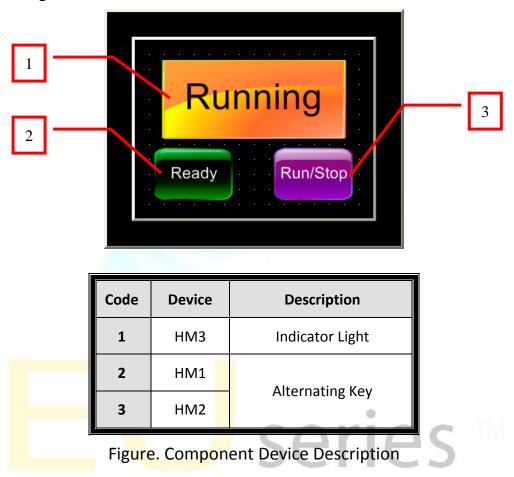
Macro	Full	Partial	No Support
Command	Support	Support	No Support
fmov	Mitsubishi	Delta DVP	
		FATEK FB	
		OMRON	SIEMENS
		Panasonic	
		VIGOR V	



Appendix A General Practice

Interlock Keys

Open EU Editor 2.0 Software and set up the following components in the editing screen in order to have a key interlock function. Read the following Table for more details.



Choose from Library of the toolbar to open the *Macro Library* dialog box. Click to open the *Macro Editor* dialog box for editing. Please use the following figure as a reference for macro writing.

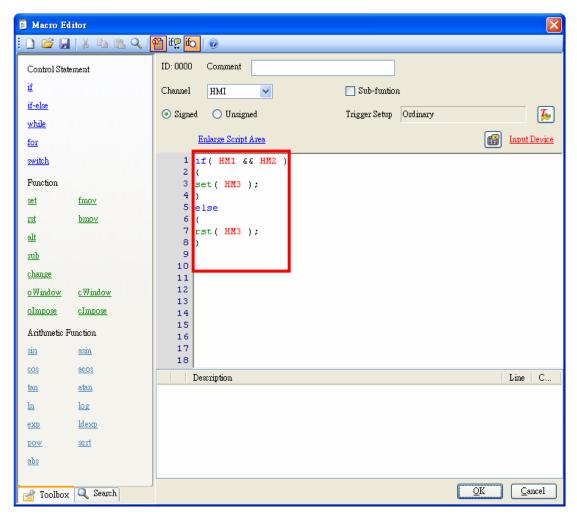


Figure. Macro Editor

When HM1 and HM2 keys are both activated, the indicator light of HM3 will be turned on. Otherwise, the indicator light of HM3 will go off. The procedure flow chart is presented in the figure below.

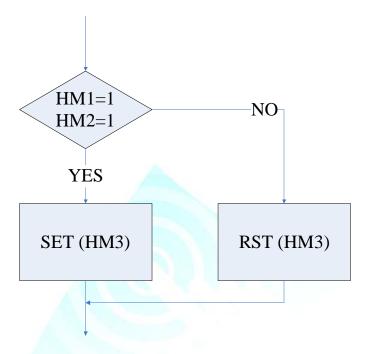


Figure. The Procedure Flow Chart



Criteria Selection for Export

Open EU Editor 2.0 Software and create the following components to obtain criteria selection export functions. Read the following Table for more details.

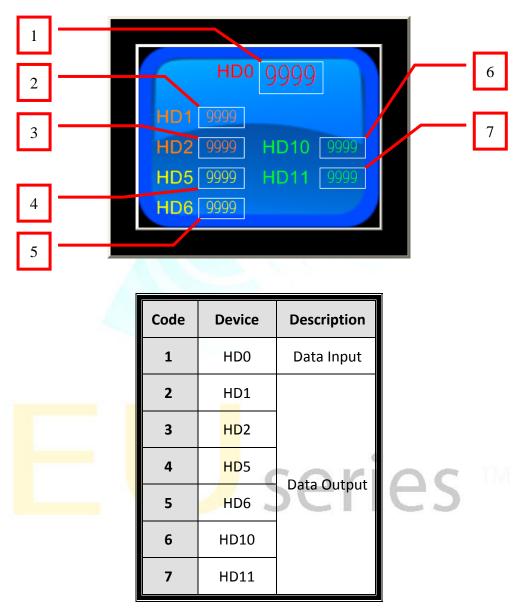


Figure. Component Device Description

Choose from Library of the toolbar to open the *Macro Library* dialog box. Click to open the *Macro Editor* dialog box for editing. Please use the following figure as a reference for macro writing.

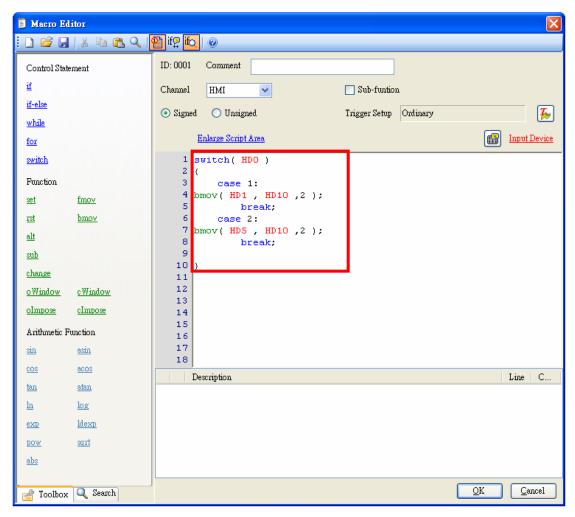
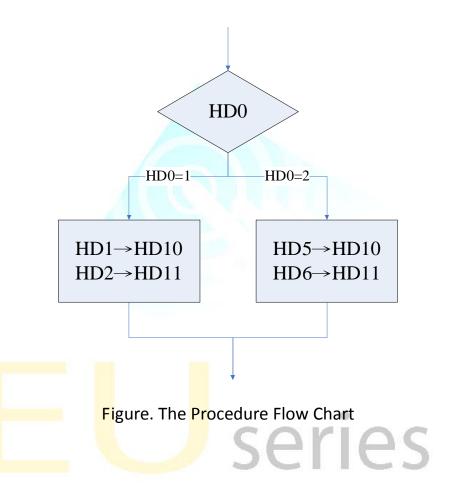


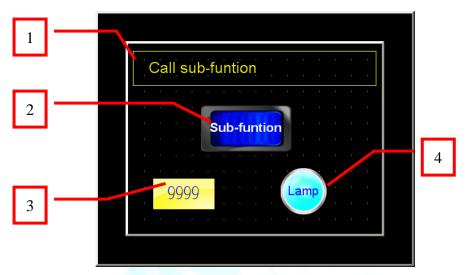
Figure. Macro Editor

When the input value of HD0 is 1, macro bmov function would transfer the data in the devices of HD1 and HD2 to HD10 and HD11. When the input value of HD0 is 2, the data in HD5 and HD6 will be transferred to HD10 and HD11. The procedure flow chart is presented as follows.



Call Sub-function

Open EU Editor 2.0 Software and set up the following components in the editing screen to have a subroutine calling function. Read the following table for more details.



Code	Device	Description	
1	HM1	Front Message Tickers	
2	НМ0	Alternating Key	
3	HD0	Data Display	
4	HM2	Indicator Light	

Figure. Component Device Description

Set up 2 macro data in the macro library; one for the main program while the other for the subroutine. See the figure below.

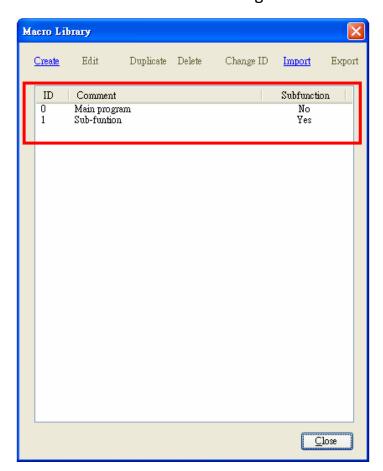


Figure. Macro Library

Series

Choose from Library of the toolbar to open the *Macro Library* dialog box. Click to open the *Macro Editor* dialog box for editing. Please use the following figure as a reference for macro writing.

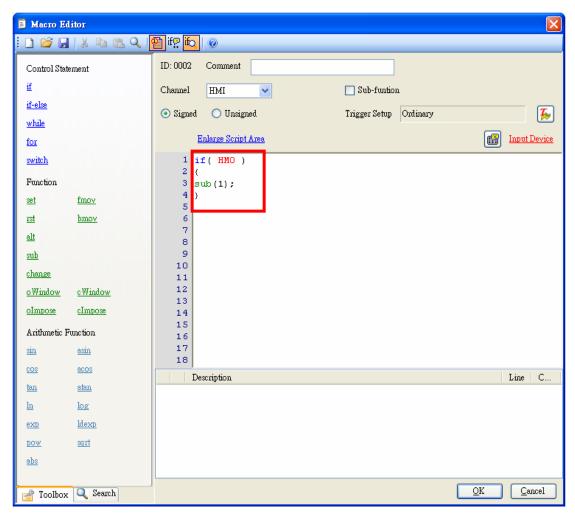


Figure. Main Program

A new set of subroutines is required for run the corresponding action. Select Sub-funtion from the Macro Editor to change the macro program to a subroutine. The macro writing is presented below.

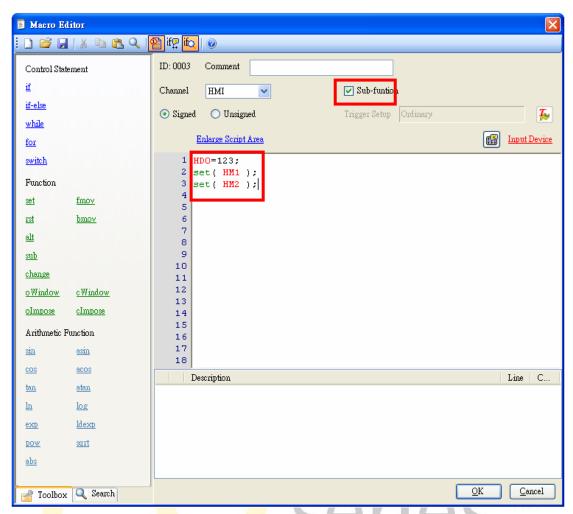


Figure. Subroutine

When pressing the HMO key, the main program would call for the subroutine. Use subroutine. Use subroutine command to call for and to run the subroutine. After run the subroutine, 123 will be written in HDO device. Also, the front message ticker HM1 and indicator light HM2 will be turned on. The procedure flow chart is presented below.

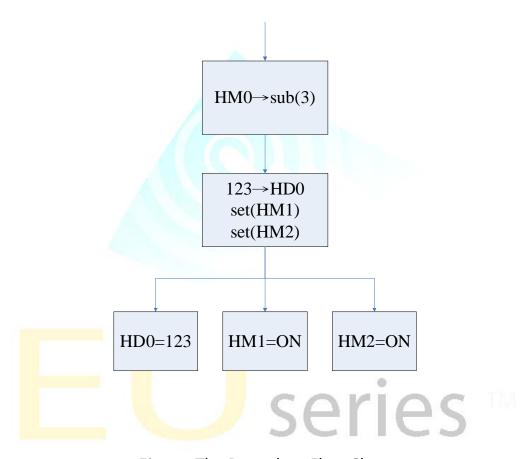


Figure. The Procedure Flow Chart