Topic: The application of the file registers in DVP series PLCs

Applicable model	DVP-EH3 series, DVP-SV2 series, DVP-SX series, DVP-SX2 series, DVP-ES2/EX2 series, DVP-SA2 series
Keyword	File register

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1 Preface and Purpose

Preface:

If the data registers in a PLC is not suffcient for the data processed and the data calculated, users can store the data processed and the data calcualted in file registers. There are 16 bits in a file register. If a double word needs to be stored, two consective file resgisters can be used.

Data register	Users can store values in data registers. The value in a data register is a 16-bit binary value. If a double word needs to be stored, two consecutive data registers can be used. ☞ Representation: D0~D11999 represent data registers. D is a device symbol. Data register numbers are decimal numbers.
File register	File registers are not assigned device numbers. Users have to read data from file registers or write data to file registers by means of API 148 MEMR, API 149 MEMW, WPLSoft, or ISPSoft ☞ Representation: K0~K9,999 represent file registers. There is no device symbol. File register numbers are decimal numbers.

Purpose: Helping users know how to use WPLSoft or ISPSoft to edit the values in file registers

1. Using the instructions API 148 MEMR and API149 MEMW to write data to file registers and read data from file registers
2. Using M1101 and D1101~D1103 to send the values in file registers to data registers at the time when the PLC is powered
3. Using WPLSoft or ISPSoft to write data to file registers/read data from file registers

2 Applicable Models

2.1 DVP Series

Series	File register	File register range	MEMR/MEMW	M1101
SX	V	K0~K1599 (1600 file registers in total)	V	V
EH3	V	K0~K9999 (10000 file registers in total) **Version 1.40 and above:** K10000~K49999 are added. (50000 file registers in total)	V (Note 2)	V
SV2	V	K0~K9999 (10000 file registers in total) **Version 1.20 and above:** K10000~K49999 are added. (50000 file registers in total)	V (Note 2)	V
ES2/EX2	**Version 2.80 and above**	K0~K4999 (5000 file registers in total)	**Version 2.4 and above**	--
SA2	**Version 2.0 and above**	K0~K4999 (5000 file registers in total)	**Version 2.4 and above**	--
SX2	**Version 2.0 and above**	K0~K4999 (5000 file register)	**Version 2.4 and above**	--
SS2	--	--	--	--
SE	--	--	--	--
MC	--	--	--	--
TP04P/TP70P	--	--	--	--

Note 1: -- means " Not supported", and V means "Supported".

Note 2: EH3/SV2 version 1.86 and above can use the instruction MEMW to write data to file register 10000~file register 49999. (The instruction DMEMW is not supported.)

3   Application of File Registers

3.1   Descriptions of API 148 MEMR and API 149 MEMW

3.1.1   Description of API 148 MEMR

API	Instruction code	Operand	Function
148	MEMR	(m) (D) (n)	Reading data from file registers

Operands:

m: File register number

D: Starting device number

n: Data length

Operand ranges:

Series	m	D	n
ES2/EX2/SA2/SX2	0~4999	D2000~D9999	1~5000[*1]
SX	0~1599	D2000~D4999 Version 3.0 and above: D2000~D9999	1~1600
EH3/SV2	0~9999 EH3 version 1.4 and above/SV2 version 1.2 and above: 0~49999	D2000~D11999	1~8000

*1. If the number of values used by MEMR in ES2/EX2/SA2/SX2 is not in the range of 1 to 5000, the PLC will automatically change the number of values used by MEMR to 5000, and MEMR will still be executed.

Explanation:

1. SX/EH3/SV2 support the 32-bit instructions DMEMR and DMEMRP, and ES2/EX2/SA2/SX2 do not support the 32-bit instruction DMEMR and DMEMRP.
2. If **m**, **D**, and **n** are out of the ranges available, an operation error will occur, the instruction will not executed, M1067 and M1068 will be On, and the value in D1067 will be H'0E1A.
3. If no data is in the file registers specified in SX/EH3/SV2, the values read by default will be 0. If no data is in the file registers specified in ES2/EX2/SA2/SX2, the values read by default will be -1.

Example 1: Reading data from file registers
【Control requirement】
If X0 is On, the values in file register 10~file register 109 will be read, and stored in D2000~D2099.
If X0 is On, MEMR will be executed. If X0 becomes Off, MEMR wiill not be executed, and the values read previously will not be changed.

File register   Data register
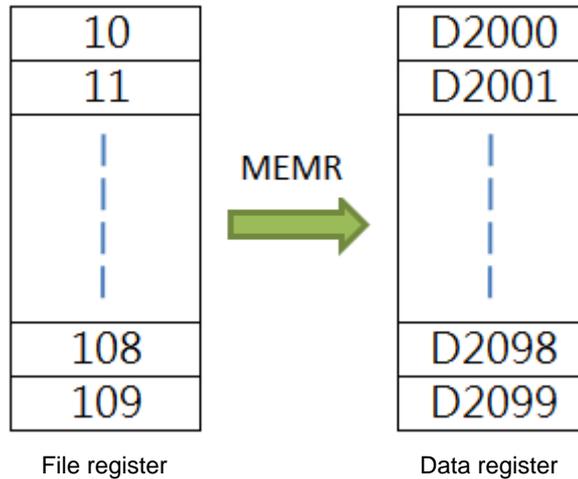
【Descriptions of devices】

Device in a PLC	Description
X0	X0 is used to enable MEMR.

【Control program】
Program in WPLSoft:
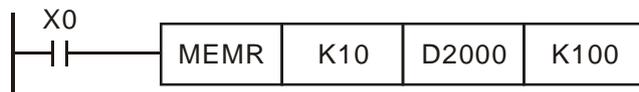
Program in ISPSoft:

3.1.2 Description of API149 MEMW

API	Instruction code		Operand	Function
149	MEMW	P	S m n	Writing data to file registers

Operands:
S: Starting device number
m: File register number
n: Data length

Operand ranges:

Series	S	m	n
ES2/EX2/SA2/SX2	**D2000~D9999**	0~4999[*1]	1~100

Series	S	m	n
SX	D2000~D4999 Version 3.0 and above: D2000~D9999	0~1599	1~1600
EH3/SV2	D2000~D11999	0~9999 EH3 version 1.4 and above/SV2 version 1.2 and above: 10000~49999[*2]	1~8000

*1. The values stored in file register 0~file register 4999 in a PLC are also stored in the flash ROM in the PLC. The value in a file register can be overwritten one hundred thousand times at most. 100 values at most can be written to file registers at a time. Please refer to point 3 below for more information.

*2. The values stored in file register 10000~file register 49999 in a PLC are also stored in the flash ROM in the PLC. The value in a file register can be overwritten one hundred thousand times at most. If values need to be written to file registers in the range of 10000~49999 by means of MEMW, **m** must be a file register number in the table below, and **n** must be 2048. Please refer to point 6 and example 2 below for more information.

Explanation:
1. SX/EH3/SV2 support the 32-bit instructions DMEMW and DMEMWP, and ES2/EX2/SA2/SX2 do not support the 32-bit instructions DMEMW and DMEMWP.
2. If **S**, **m**, and **n** are out of the ranges available, an operation error will occur, the instruction will not executed, M1067 and M1068 will be On, and the value in D1067 will be H'0E1A.
3. In ES2/EX2/SA2/SX2, the values stored in the file registers are also stored in the flash ROM. The value in a file register can be overwritten one hundred thousand times at most. 100 values at most can be written to file registers at a time. Besides, values can be written to file registers only when a conditional contact is turned from Off to On. **Note: The value in a file register can be overwritten one hundred thousand times at most. Please use the file registers in ES2/EX2/SA2/SX2 carefully.**
4. There are 10,000 16-bit file registers in EH/EH2/SV/EH3/SV2. There are 50,000 file registers in EH3 series PLC whose version is 1.40/EH3 series PLC whose version is above 1.40/SV2 series PLC whose version is 1.20/ SV2 series PLC whose version is above 1.20. Owing to the fact that the values in the 40,000 file registers 10000~49999 in a PLC are also stored in the flash ROM, it is suggested that users write values to these file registers by means of WPLSoft or ISPSoft.
5. EH3/SV2 version 1.86 and above support the use MEMW to write values to file register 10000~file register 49999. (EH3/SV2 version 1.86 and above do not support the use MEMW to write values to file register 10000~file register 49999. If a memory card is inserted in EH3/SV2 version 1.86 or above, MEMW can not be used to write values to the PLC.) The value in a file register can be overwritten one hundred thousand times at most, but can not be overwritten continuously. Only one MEMW instruction can be enabled in a scan cycle.
6. If values need to be written to file registers in the range of 10000~49999 by means of MEMW, **m** must be a file register number in the table below, and **n** must be 2048. (A file register number is an unsigned value. It is suggested that users use a hexadecimal value.) If **m** is not a file register number in the table below, or **n** is not 2048, values will not be written, and an operation error will occur. Although only 1088 values can be written if **m** is K48912, **n** still needs to be 2048 in that the PLC can automatically prevent values from being written to devices not available. Please refer to example 2 for more information.

Section number	File register number	Section number	File register number
1	K10000 (H2710)	2	K12048 (H2F10)
3	K14096 (H3710)	4	K16144 (H3F10)
5	K18192 (H4710)	6	K20240 (H4F10)
7	K22288 (H5710)	8	K24336 (H5F10)
9	K26384 (H6710)	10	K28432 (H6F10)
11	K30480 (H7710)	12	K32528 (H7F10)
13	K34576 (H8710)	14	K36624 (H8F10)
15	K38672 (H9710)	16	K40720 (H9F10)

Section number	File register number	Section number	File register number
17	K42768 (HA710)	18	K44816 (HAF10)
19	K46864 (HB710)	20	K48912 (HBF10)

7. It takes 84 milliseconds for 2048 values to be written to file registers in the range of 10000 to 49999. It is suggested that values are written when the PLC does not need to operate rapily.

Example 1: Writing data to file registers
【Control requirement】
The instruction MEMW is used to write the values in D2000~D2099 to file register 10~file register 109.
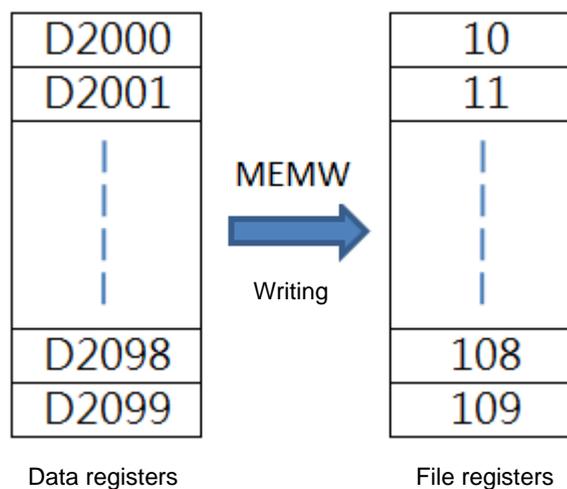
Data registers   File registers

【Device description】

Device in a PLC	Description
X0	X0 is used to enable the instruction MEMW.

【Control program】
Program in WPLSoft:
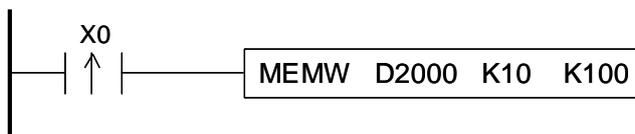
Program in ISPSoft:

Example 2: Writing data to the file registers in the range of file register 10000 to file register 49999 in EH3/SV2
【Control requirement】
The instruction MEMW is used to write the values in the 2048 devices starting from D2000 to the file registers starting

from file register 48912. (Although only 1088 values can be written if **m** is K48912, **n** still needs to be 2048 in that the PLC can automatically prevent values from being written to devices not available.)
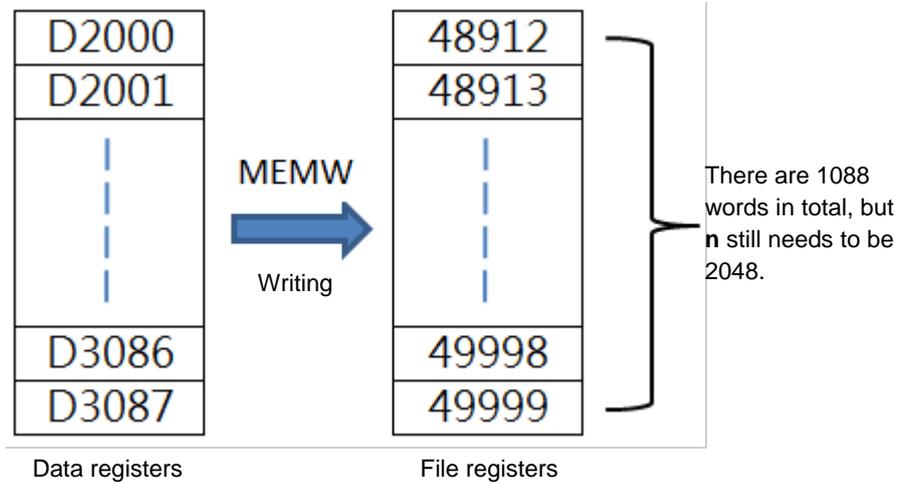
【Device description】

Device in a PLC	Description
X0	X0 is used to enable the instruction MEMW.

【Control program】
Program in WPLSoft:
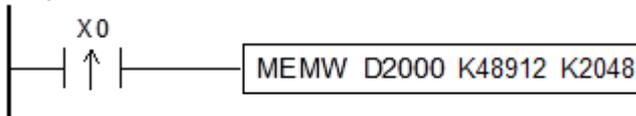
Program in ISPSoft:

3.2 Using M1101 and D1101~D1103

The values in file registers can be sent to data registers by means of special D devices and a special M device.
1. If the value in D1101 in EH3/SV2 is less than 0 or greater than K9,999, or the value in D1103 in EH3/SV2 is less than K2,000 or greater than K9,999, the action or reading values from file registers to data registers can not be executed.
2. When SX is powered, it decides whether the values in file registers needs to be sent to data registers by means of M1101, D1101, D1102, and D1103.
3. If the value in D1101 in SX is less than 0 or greater than K1,599, or the value in D1103 in SX is less than K2,000 or greater than K4,999, the action or reading values from file registers to data registers can not be executed.
4. If a file register number or a data register number is not an address available, the PLC will stop the action of reading values from file registers to data registers

5. Related special auxiliary and special data registers

Flag	Function
M1101	M1101 is used to enable the function of sending the values in file registers to data registers. It is set to Off by default.
Special D device	**Function**
D1101	The value in D1101 indicates a starting file register number. D1101 is a latching device. The default value in D1101 is 0. SX: K0~K1,599 EH3/SV2: K0~K9,999
D1102	The value in D1102 indicates the number of values which need to be read. D1102 is a latching device. The default value in D1102 is 0. SX: K1~K1,600 EH3/SV2: K1~K8,000
D1103	The value in D1103 indicates a starting data register number. D1103 is a latching device. The factory setting in D1103 is 2,000. SX: K2,000~K4,999 EH3/SV2: K2,000~K9,999

Example 1: M1101 and D1101~D1103

【Control requirement】

1. If a PLC is powered, the values in file registers 0~49 will be sent to D4000~D4049 automatically.

File registers   Data registers
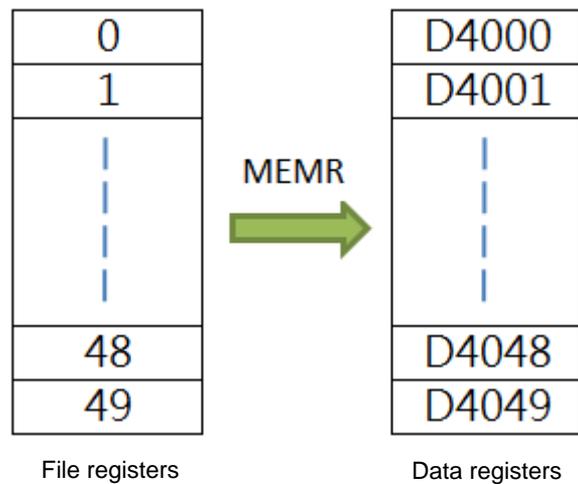
2. If X0 is On, the values in D2000~D2099 will be written to file register 0~file register 99.
3. If X1 is On, the values in file register 0~file register 99 will be read, and stored in D3000~D3099.

| Data registers | File registers | Data registers |
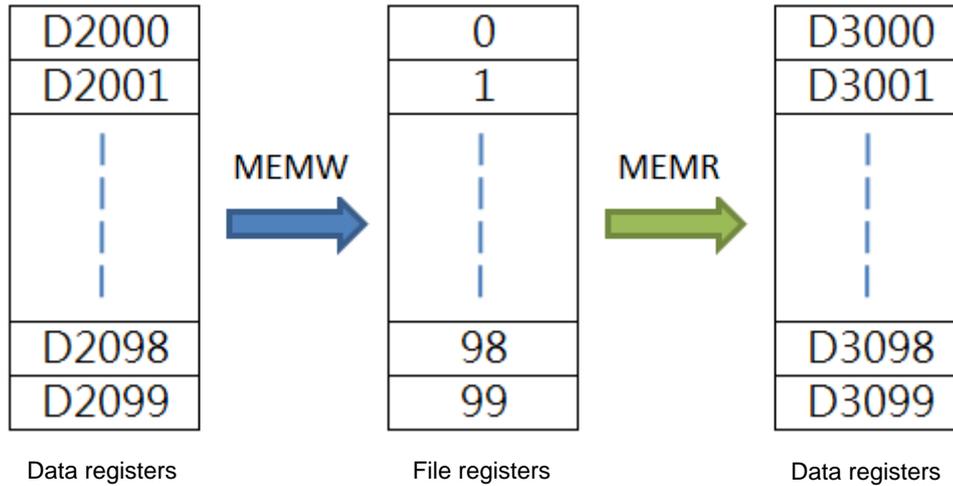
【Device description】

Device in a PLC	Description
X0	X0 is used to enable MEMW.
X1	X1 is used to enable MEMR.

【Control program】
Program in WPLSoft:
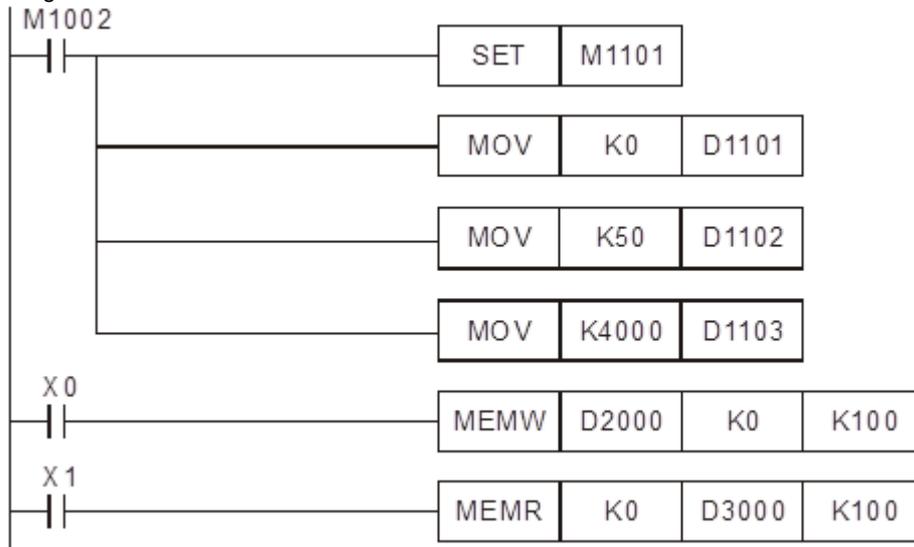
Program in ISPSoft:
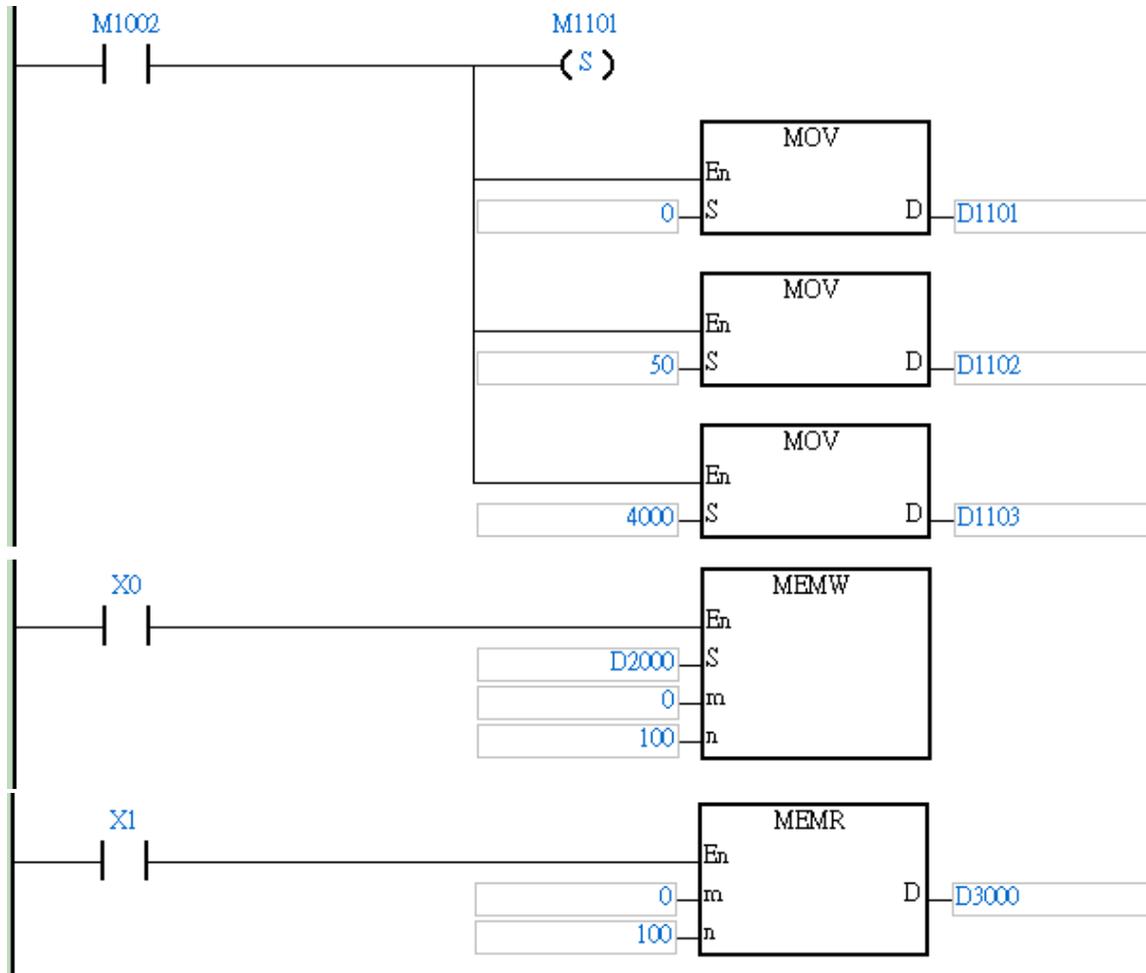
3.3 Using Software to Edit the Values in File Registers

3.3.1 Reading Data from File Registers/Writing Data to File Registers

Users can use ISPSoft or WPLSoft to edit the values in several file registers in SX/EH3/SV2 at a time. The new values in these file registers can be saved and downloaded.

● **ISPSoft**

　　Click **Edit File Register Memory** on the **PLC** menu to open the **Edit File Register Memory** window.
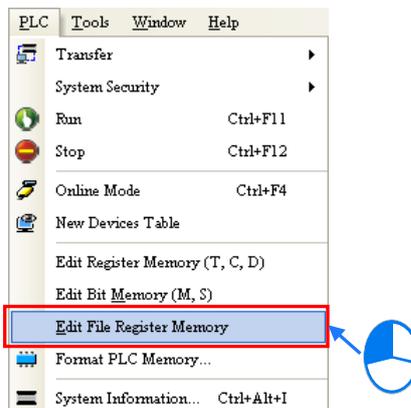
● **WPLSoft**

Click **Edit File Register Memory** on the **Communication** menu to open the **File Register** window.
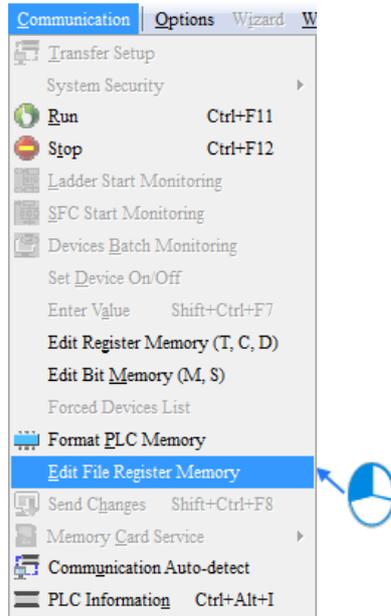
The use of ISPSoft to read data from file registers and write data to file registers is described below.

The values in the table in the **Edit File Register Memory** window are not the values uploaded form the PLC. They are the values saved last time. If the **Edit File Register Memory** window in the project is opened for the first time, the default values in the table are 0.
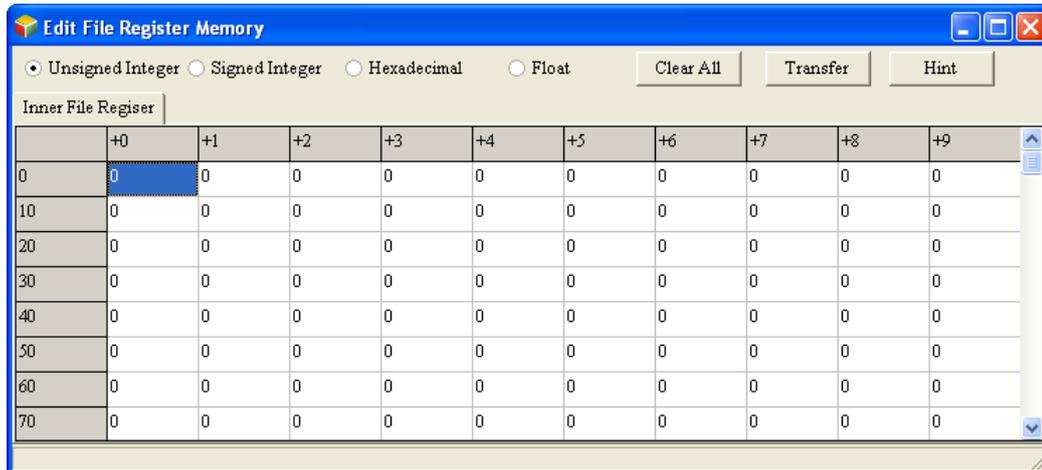
If the users want to edit the value in the cell for a file register, they can click the cell for the file register, and type a value.
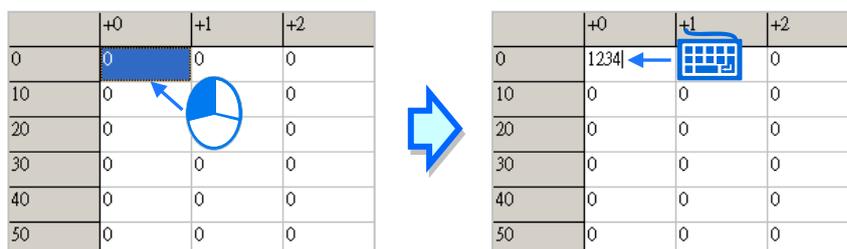
The users can select a data format at the top of the **Edit File Register Memory** window.
The switch form unsigned decimal values to hexadecimal values is shown below.
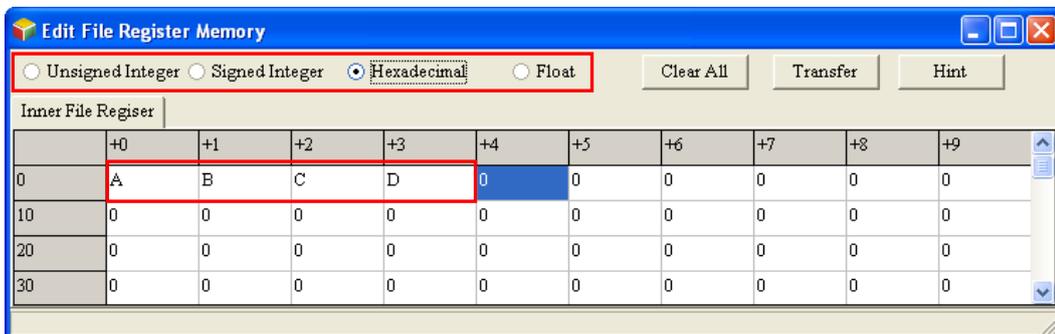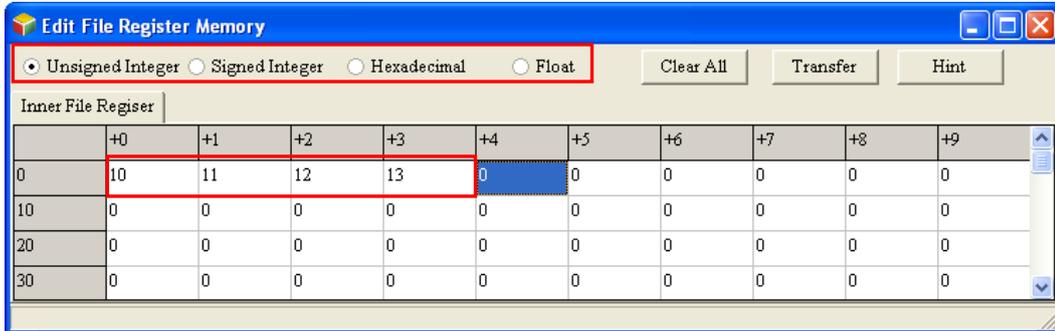
If the users click **Clear All**, the values in the **Edit File Register Memory** window will be cleared to 0.
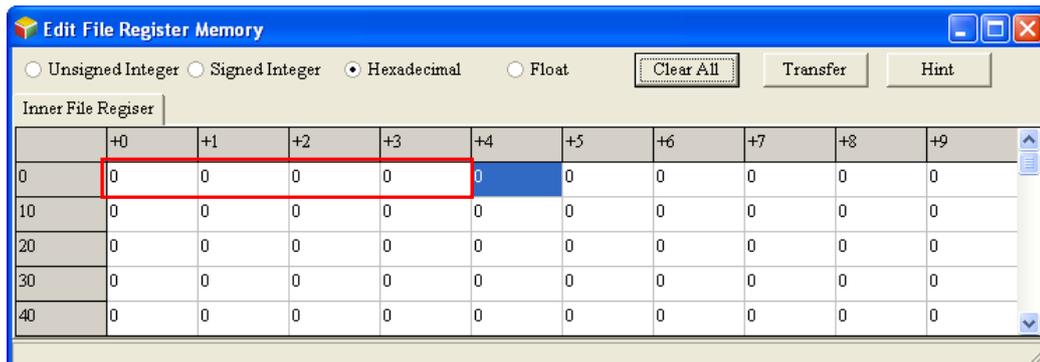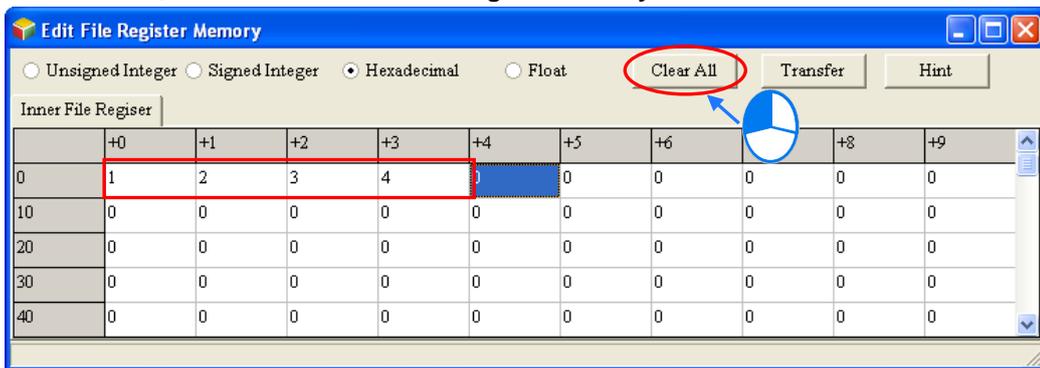
Besides, the users can clear the values on the present page by right-clicking the present page, clicking **Select All** on the context menu, right-clicking the present page again, clicking **Clear as 0** on the context menu.
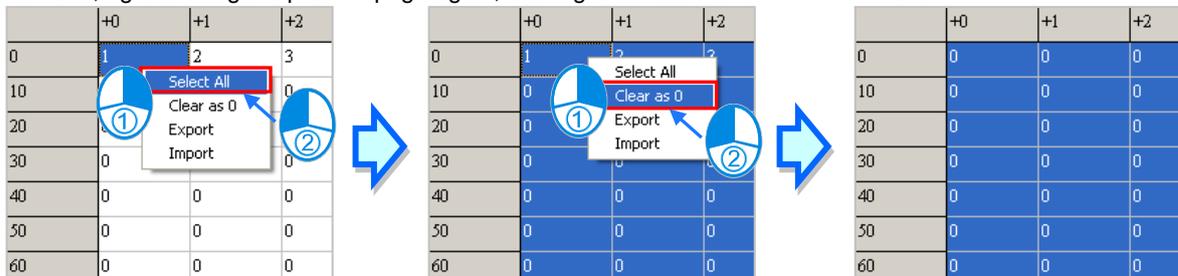
If the users want to clear the values in the cells for a range of file registers on the present page, they can drag across the cells, right-click the present page, and click **Clear as 0** on the context menu.
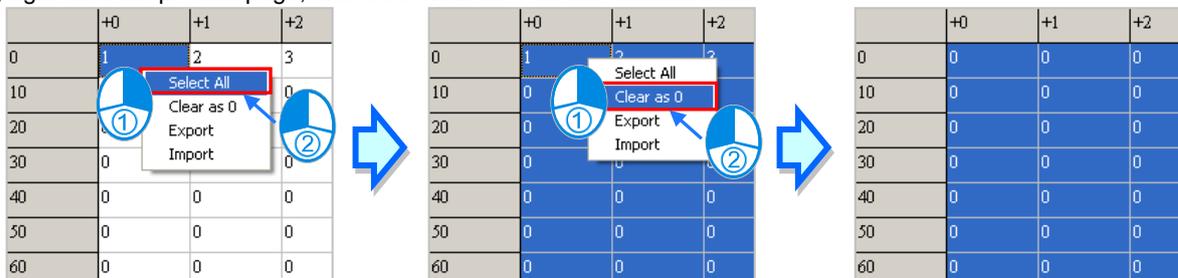
After the users click **Transfer**, the **Transfer Setup** window will appear. The users can download the values in the table to the PLC, or upload the values in the file registers from the PLC through the window. Before **Transfer** is clicked, the users have to make sure that ISPSoft is connected to the PLC normally.

Select **Read form PLC** or **Write to PLC** in the **Transmission Type** drop-down list box, and then select the **All** option button or the **Part** option button. After the setting is complete, the users can click **OK**.
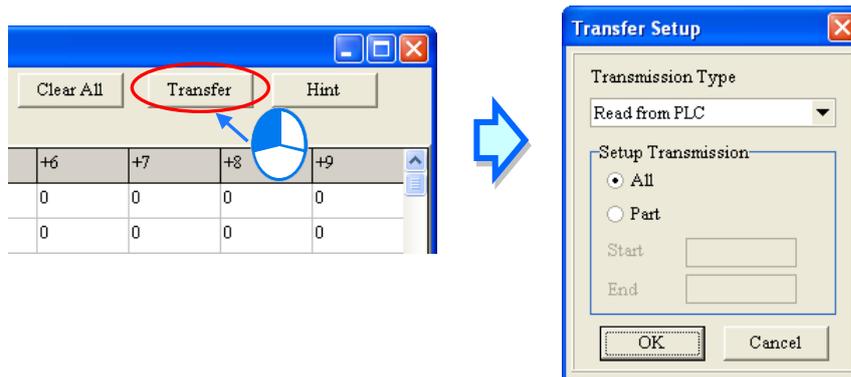
⚠ **Before the values are written into the registers, users have to make sure that the operation does not affect**

the system, or cause damage to the system and staff.

3.3.2 Saving the Values in File Registers

● **ISPSoft**
If the present window is the **Edit File Register Memory** window, the values in the **Edit Register Memory** window will be saved as a wft file whose primary filename is the project name in the folder in which the project (*.isp) is saved after users click **Save** on the **File** menu or the toolbar. If the users want to open the **Edit File Register Memory**

window in the project again, the system will open the wft file in the folder in which the project (*.isp) is saved. If no wft is in the folder in which the project is saved, the values in the **Edit File Register Memory** window will be 0.

Besides, the users can save the values in the **Edit File Register Memory** window as a wft file in another folder after they click **Save As** on the **File** menu. If the users want to open the wft file which was saved previously, they can click **Open** on the **Fil**e menu or the toolbar.
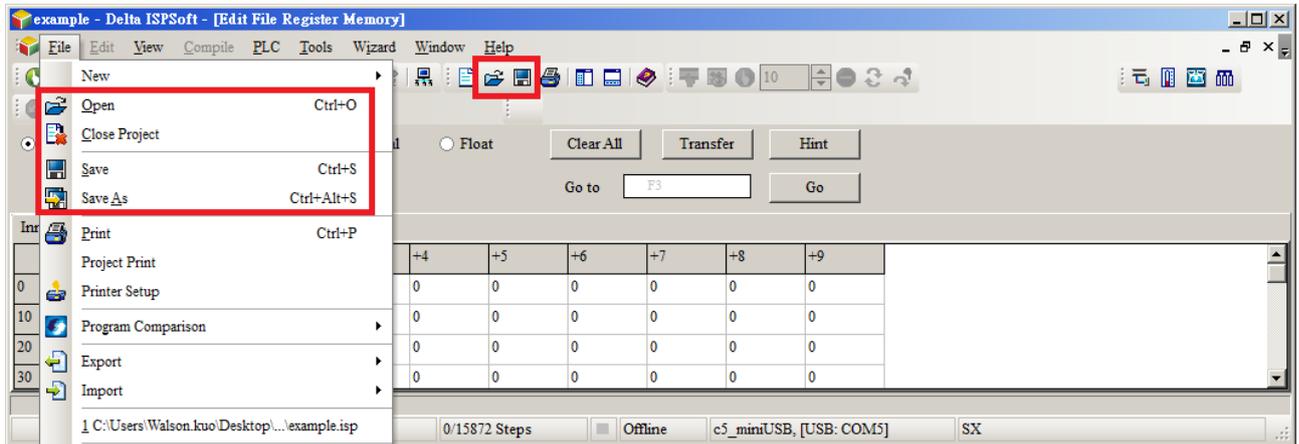
- **WPLSoft**

  If the present window is the **File Register** window, the values in the **File Register** window will be saved as a wft file whose primary filename is the project name in the folder in which the project (*.dvp) is saved after users click **Save** on the **File** menu or the toolbar. If the users want to open the **File Register** window in the project again, the system will open the wft file in the folder in which the project (*.dvp) is saved. If no wft is in the folder in which the project is saved, the values in the **File Register** window will be 0.

  Besides, the users can save the values in the **File Register** window as a wft file in another folder after they click **Save As** on the **File** menu. If the users want to open the wft file which was saved previously, they can click **Open** on the **Fil**e menu or the toolbar.
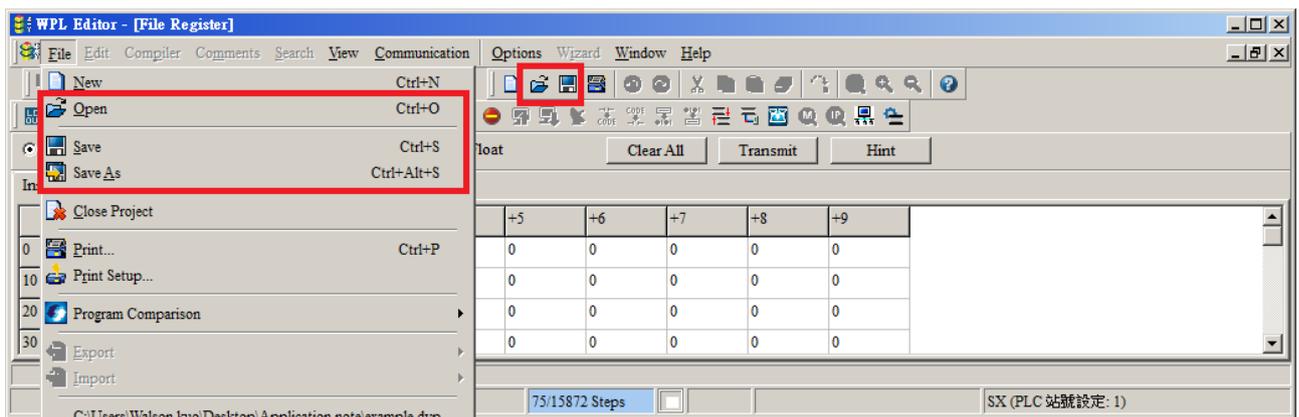
3.3.3 Exporting/Importing the Values in File Registers

● Exporting the values in file registers
The use of ISPSoft to export the values in file registers is described below.
Users can export the values in the **Edit File Register Memory** window as a CSV file, and edit the CSV file through Microsoft Excel. If the users want to export the values in the **Edit File Register Memory** window, they can right-click the page in the **Edit File Register Memory** window, click **Export** on the context menu, select a folder in the **Save in** drop-down list box in the **Save As** window, type a filename in the **File name** box, and click **Save**.
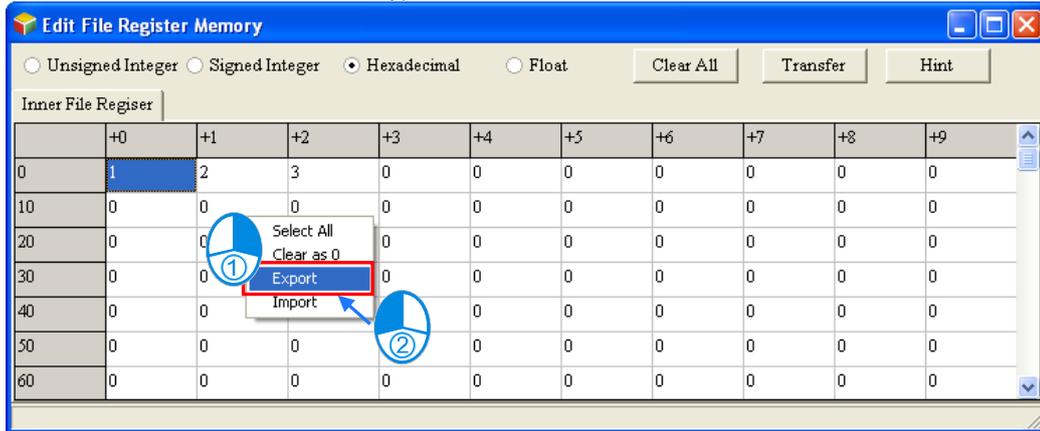
● Importing the values in file registers
The use of ISPSoft to import the values in file registers is described below.
If users want to import a CSV file into the **Edit File Register Memory** window, they can right-click the page, click **Import** on the context menu, select the CSV file in the **Open** window, and click **Open**.
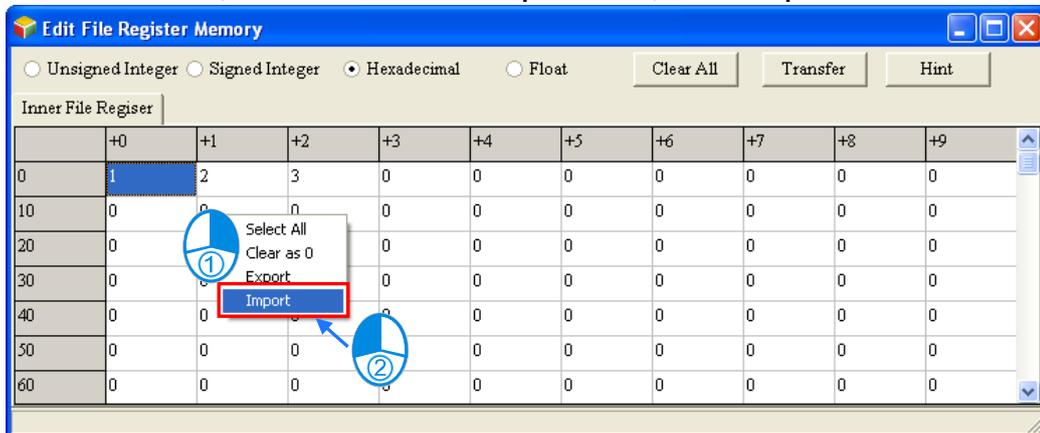
● Hint

The use of ISPSoft to drop a hint is described below.

After users click **Hint** in the **Edit File Register Memory** window, the **ISPSoft** window will appear. After a hint is typed in the **ISPSoft** window, the hint will appear at the bottom of the **Edit File Register Memory** window. The hint is saved with the values in the **Edit File Register Memory** window. After the users open a wft file, they can identify the table in the file through the hint in the file.
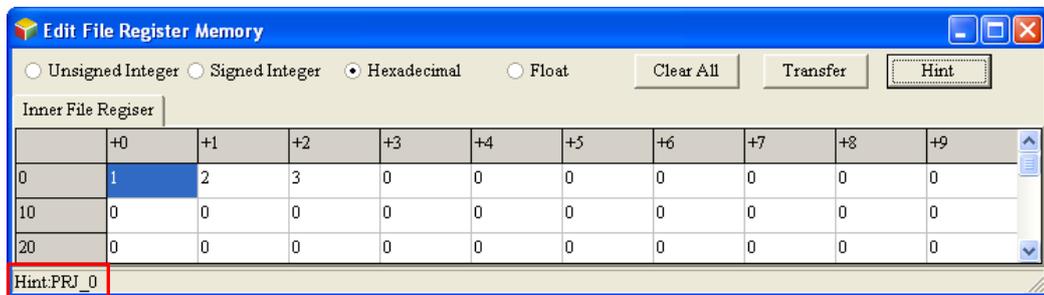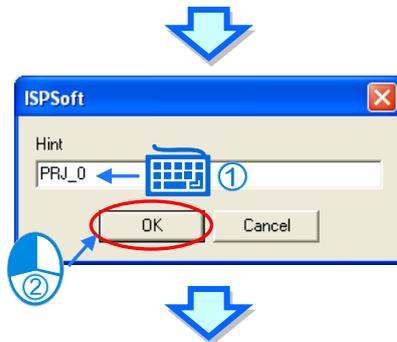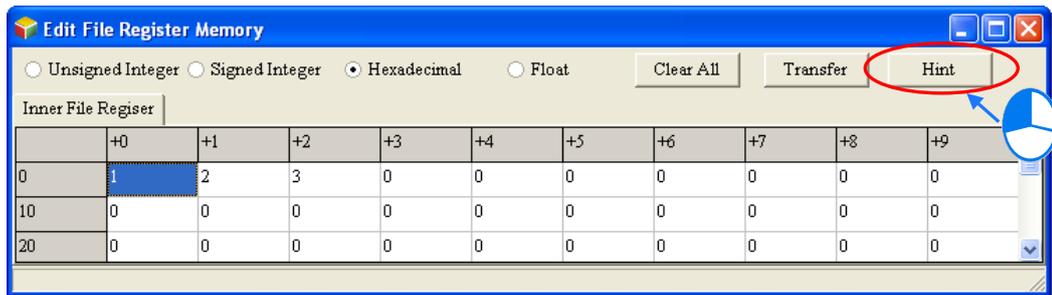
- Printing the present page in the **Edit File Register Memory/File Register** window
  - ISPSoft
    If the present window is the **Edit File Register Memory** window, users can print the present page in the **Edit File Register Memory** window by clicking **Print** on the **File** menu or [printer icon] on the toolbar.
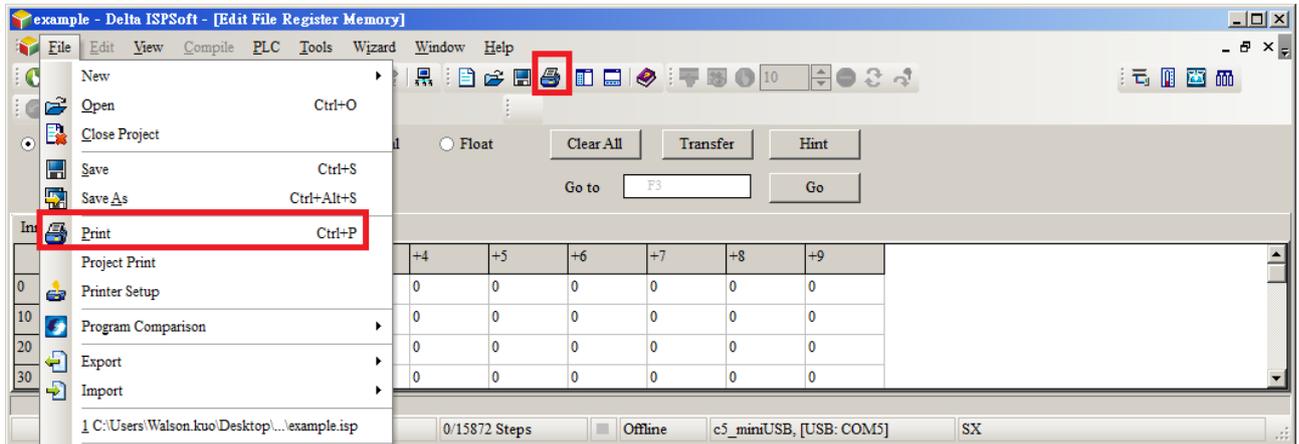
  - WPLSoft
    If the present window is the **File Register** window, users can print the present page in the **File Register** window by clicking **Print** on the **File** menu or [printer icon] on the toolbar.
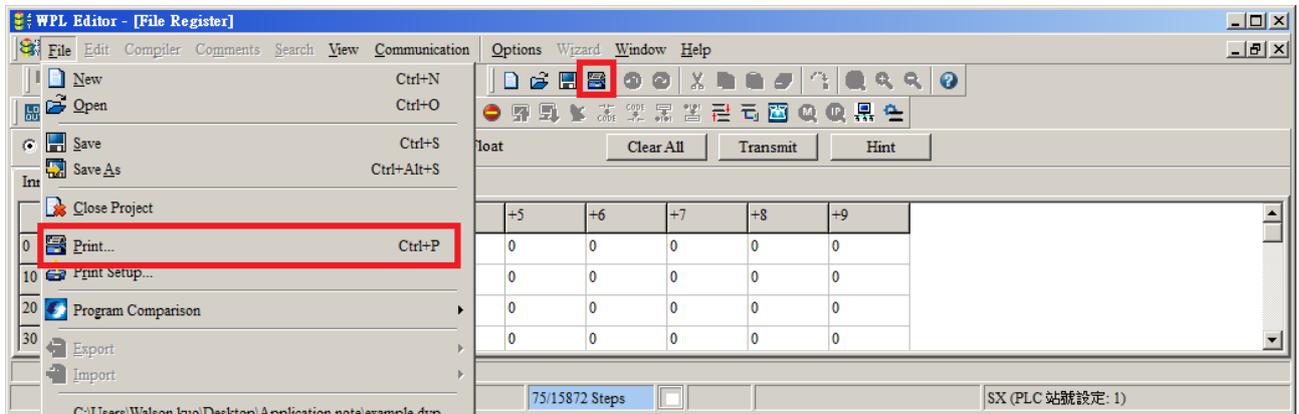
The use of ISPSoft to print the present page in the **Edit File Register Memory** window is described below.

In the **Printer Setup** window, users have to select the **All** option button or the **Part** option button in the **Print Options** section, set margins, and select items which will be added. After the users click **Printer Setup**, they can select a printer, and set a print format. After the users click **Preview**, they can preview the document which will be printed. After the setting is complete, the users can click **Print** in the **Preview** window.