How to use ISaGRAF PAC plus i-87089 - the VW sensor master card to measure the Vibration Wire frequency to calculate the internal stress of constructions ?

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ICP DAS releases the effective VW sensor solution (Vibration Wire solution). This solution has been successfully applied in some water dams monitoring system near the city Wuhang (武漢) in China . It is useful for measuring the internal stress of constructions like building, bridge, dam, etc..

The following ISaGRAF PACs can support the i-87089 (the VW master card) plus the DN-1618U (daughter board) . Please make sure if your ISaGRAF PAC has the correct ISaGRAF driver inside.

	ISaGRAF driver version	I/O Slot number supported
Wincon-8347 / 8747	Since 4.02	1 ~ 7, max 7 i-87089 (the leftmost is slot 1)
i-8437-80 / i-8837-80	Since 4.04	0 ~ 3, max 4 i-87089 (the leftmost is slot 0)
i-8417 / i-8817	Since 4.04	0 ~ 3, max 4 i-87089 (the leftmost is slot 0)
iPAC-8447 / 8847	Will be available (around Jul.2008)	0 ~ 7, max 8 i-87089 (the leftmost is slot 0)
WinPAC-8447 / 8847	Will be available (around Sep.2008)	0 ~ 7, max 8 i-87089 (the leftmost is slot 0)

(Each i-87089 can connect max. 4 pcs. of DN-1618U daughter boards. Each DN-1618U can connect max. 8 channels of V W sensors. So each i-87089 can measure max. 8 x 4 = 32 channels of VW frequency .)

The new released ISaGRAF driver : http://www.icpdas.com/products/PAC/i-8000/isagraf-link.htm
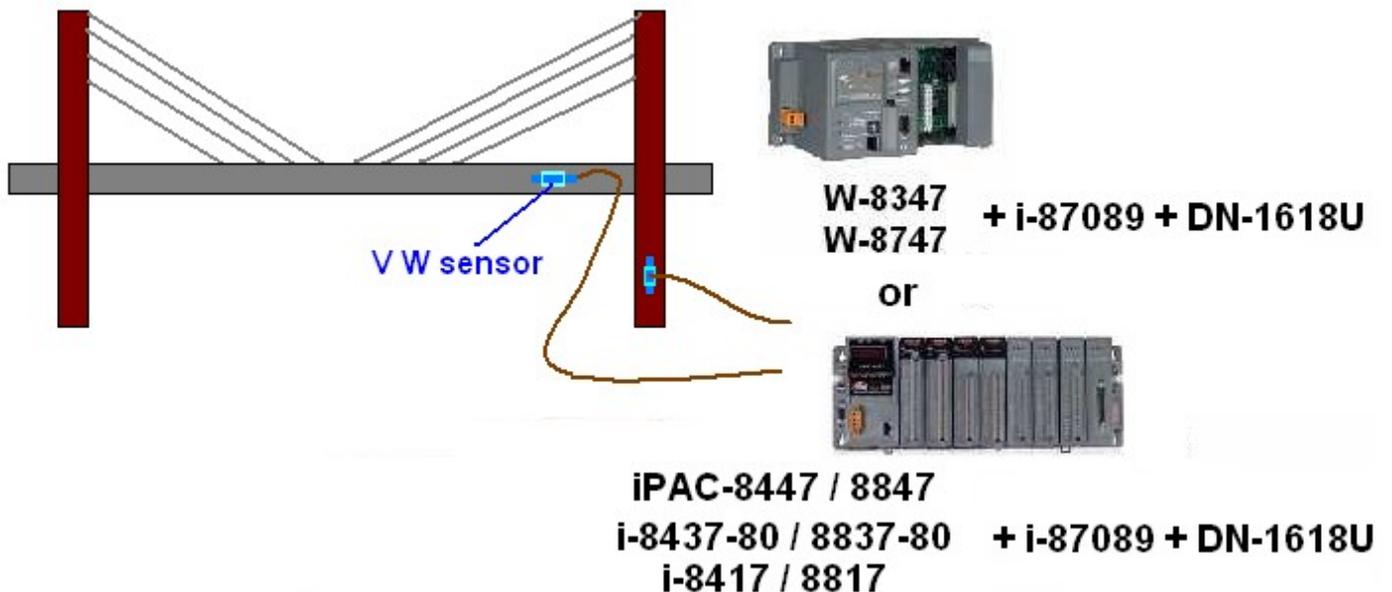
 (This figure only for introduction. The dimension and configuration should depend on the real application)

Every DN-1618U has a 8-bit dip-switch to set its NET-ID. If only one DN-1618U connected by the i-87089 , please set its NET-ID to 1 (turn its Dip 1 to "ON" position). If two connected, please set the first one as 1 , the other DN-1618U should set as 2. (turn its Dip 2 to "ON") . If three connected, please set the first one as 1 , the second one as 2, the last DN-1618U as 3 (turn its Dip 1 and 2 to "ON") . If there is four DN-1618U connected, please set the first one as 1, the second one as 2, the third one as 3 and setting the last DN-1618U as 4 (turn its Dip 3 to "ON" position) .

1.1 : Writting program to use i-87089

Note: Normally, the i-87089 is for measuring the frequency of VW Sensors. If use's VW sensors also support temperature measuring, please import the proper temperature table file into the i-87089 in advance. Please refer to the steps listed in section 1.2 of this document.

Please make sure if the "i_87089" - I/O complex equipment has been installed into the ISaGRAF workbench. The file name is "i_87089.xia" (visit www.icpdas.com > FAQ > Software > ISaGRAF > 091).
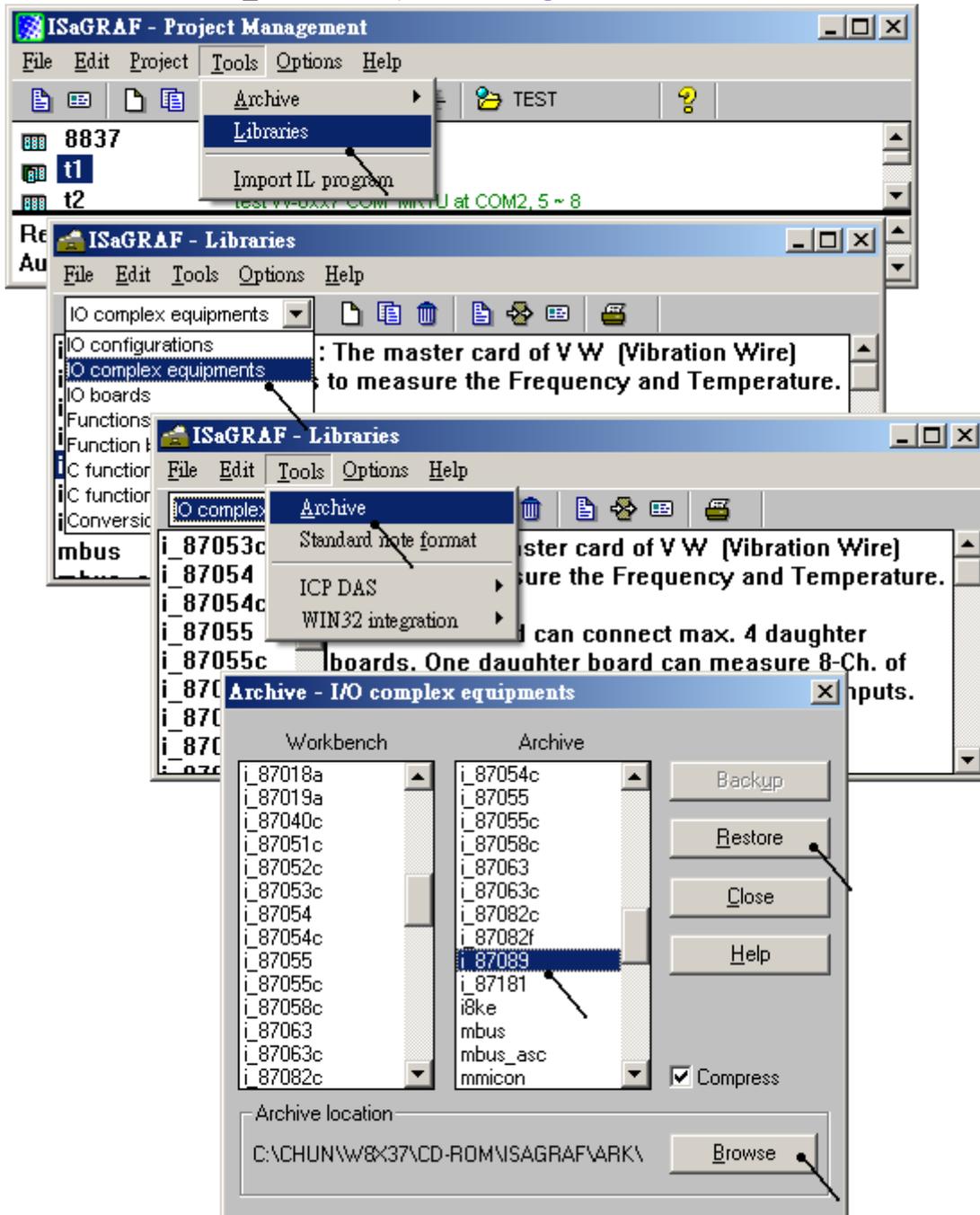
* All frequency and temperature values of the i-87089 are stored as long interger format. If user want to define the modbus network address to these IsaGRAF variables, please define them to occupy 2 modbus number. Please refer to section 4.2 of the "User's manual of the ISaGRAF PAC")

To program the i-87089, please connect the "i_87089" in the associated slot No. , then set its proper parameters for all connected channels.

Sample_rate : Unit is ms (0.001 sec). Value can be 2000 ~ 600000. It means the scan interval of channel to channel.

daughter_num: How many DN-1618U connected. value can be 1 ~ 4.

ScanSeting_xx_xx: freq. scan setting

0 : 0.4K ~ 3KHz	1 : 0.45K ~ 1.2KHz
2 : 0.8K ~ 2KHz	3 : 1.4K ~ 3.5KHz
4 : 2.4K ~ 6KHz	

For example, setting as 34111111 means setting Ch.1 as 3 (1.4 ~ 3.5KHz), Ch.2 as as 4 (2.4 ~ 6KHz), Ch.3 to 8 are as 1 (0.45 ~ 1.2KHz)

TemperFile_xx_xx: the temperature table file No. for each channel. Each digit value can be 1 ~ 8. For example, setting as 12333333 means setting Ch.1 to use temperature table File 1, Ch.2 to use file 2, Ch.3 to 8 to use File 3.

Max. 32-Ch frequency inputs. Variable type should be Integer / Input. Unit is 0.01 Hz. For ex., if value is 235058 , it means 2350.58 Hz

Type : can be 1: degree Celsius or 2: degree Fahrenheit. However if the temperature table file in the i-87089 is using Degree Fahrenheit, then setting as 1 will use "Degree Fahrenheit" . (Please refer to the description of "step 3" in section 1.2). Max. 32-ch temperature inputs. Variable type should be Integer / Input. Unit is 0.01 degree. For ex., if value is 2655 , it means the temperature is 26.55 degree. Value of 999900 means sensor-broken-line. Value of 888800 means no temperature table file found.

rest_tim : 1-Ch. Integer output to dynamically change the "rest_time". Unit is second. Can be 0 ~ 36000. It means the time to rest after one scan cycle (one cycle will scan all channels in i-87089).

1.2 : Using the VW Utility to import temperature table files into the i-87089

The i-87089 normally is for measuring the frequency of VW Sensors. There are two frequency signals in each VW senosr. Please connect them to the correct terminal pin (VW+ , VW-) of the associated channel in the DN-1618U . If the user's VW sensor also support temperature measuring, user have to import the temperature table file into the i-87089 in advance to get the correct temperature value. The associated pin for temperature is (TH+ , TH-) in each channel. The steps to import listed as below.

Step 1:

Please switch off the power of the ISaGRAF PAC. Then please connect one "CA-0904" cable in the JP2 postion (white terminal, 4-pin) of the i-87089.
http://www.icpdas.com/products/Accessories/cable/cable_selection.htm > CA-0904


(CA-0904)

Then please plug this i-87089 (with CA-0904 connected) into Wincon-8xx7's slot 2 or 3 (or slot 2 or 3 of the other PAC). Please note the leftmost slot No. of the Wincon-8xx7 is slot 1, while the i-8437-80 / i-8837-80 , i-8417 / 8817 , iPAC-8447 / 8847 and WinPAC-8447 / 8847 's leftmost slot No. is slot 0. (The CA-0904 will not work if plugging the i-87089 into slot 4 thru. 7 of the iPAC-8447 / 8847 and WinPAC) . Then please connect this CA-0904 to one RS-232 port of your PC. Then switch on the controller's power.

Step 2:

Please visit www.icpdas.com > FAQ > Software > ISaGRAF > 091 to download the document and files for the i-87089. These files includ the VW utility will be burned into the following CD-ROM since Aug.2008

    8000 CD-ROM: \napdos\ISaGRAF\some_utility\i87089\   or
    Wincon-8xx7 CD-ROM: \napdos\ISaGRAF\some_utility\i87089\

Then please install the VW Utility to your PC by running the "VW_Utility_V2003.exe" (PC should be Windows 2000, XP or compatible Operating System). Then please run VW Utility as below.
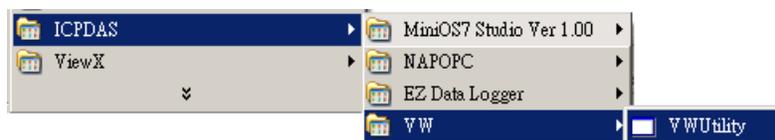

Note: The VW Utility will not run if no "MicroSoft .NET frame work 2.0" found in the PC. User may visit the below web site to get it .
http://www.microsoft.com/downloads/details.aspx?displaylang=zh-tw&FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5

Step 3:

The files download at www.icpdas.com > FAQ > Software > ISaGRAF > 091 includes two temperature table files. One is named as "GeoKon_kv4100_4150.csv", it is for some VW sensors from the "GeoKon" . The other one is named as "ACE_RTD_2k_Ohm_20_degree.csv" .

Please enter the correct RS-232 port No. in the VW Utility , then clik on "Open" to open this RS-232 port in your PC.
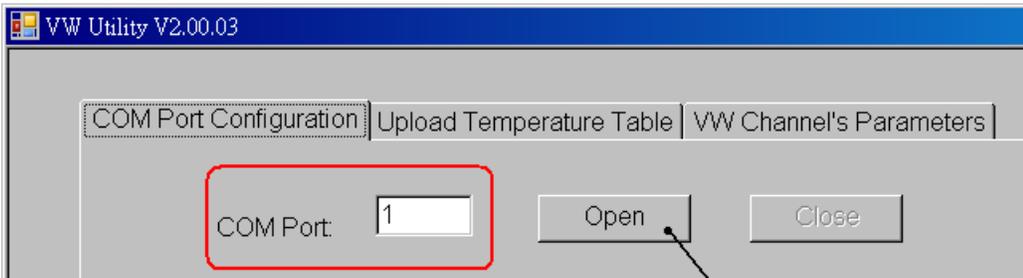
Then please click on "Upload Temperature Table" , the below window will show up. Then click on "Browse" to open the temperature table file, below is using the "GeoKon_kv4100_4150.csv" .
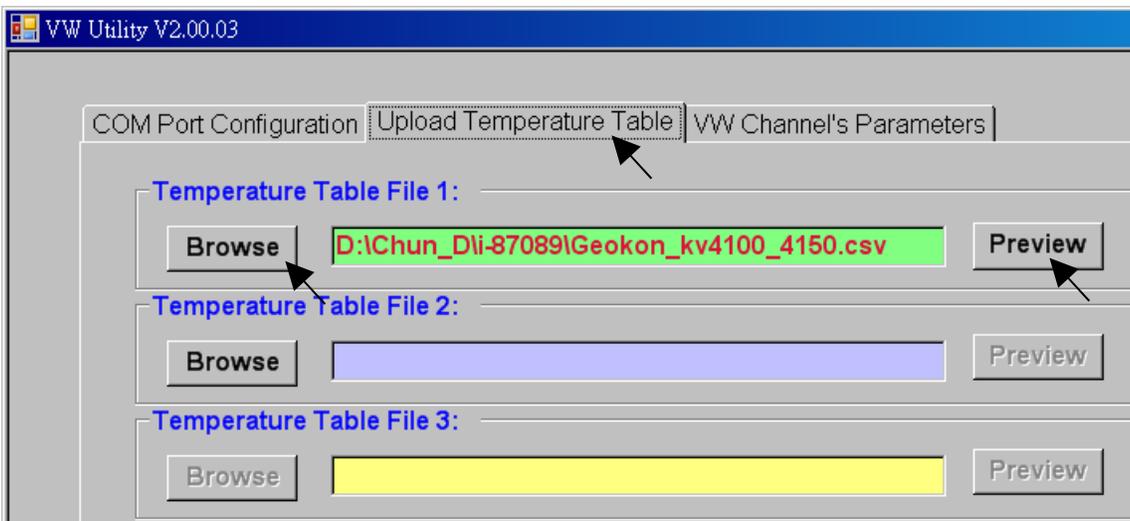
By clicking on the "PreView" of the above figure, the temperature table will show as below.

The left column is for entering the temperature value, while the right column is for entering the associated resistor value of the temperature sensor. All these values should be integer (no floating point value allowed). The top temperature value should be the lowest temperature value in this table. The temperature value should increase by going down position. It will generate wrong temperature value if the temperature value in the down position is smaller or equal to the value on the up position.

However the resistor value on the right column may increase by going up or going down. It depends on the temperature sensor.

If the temperature unit is using °C (Degree Celsius), then the "ISaGRAF I/O connection > i_87089 > Temper > Type" setting listed in section 1.1 will apply 1 as degree Celsius, apply 2 as degree Fahrenheit . However if the unit in left column is °F , then Type = 1 will apply as degree Fahrenheit (This case "2" is not allowed) .
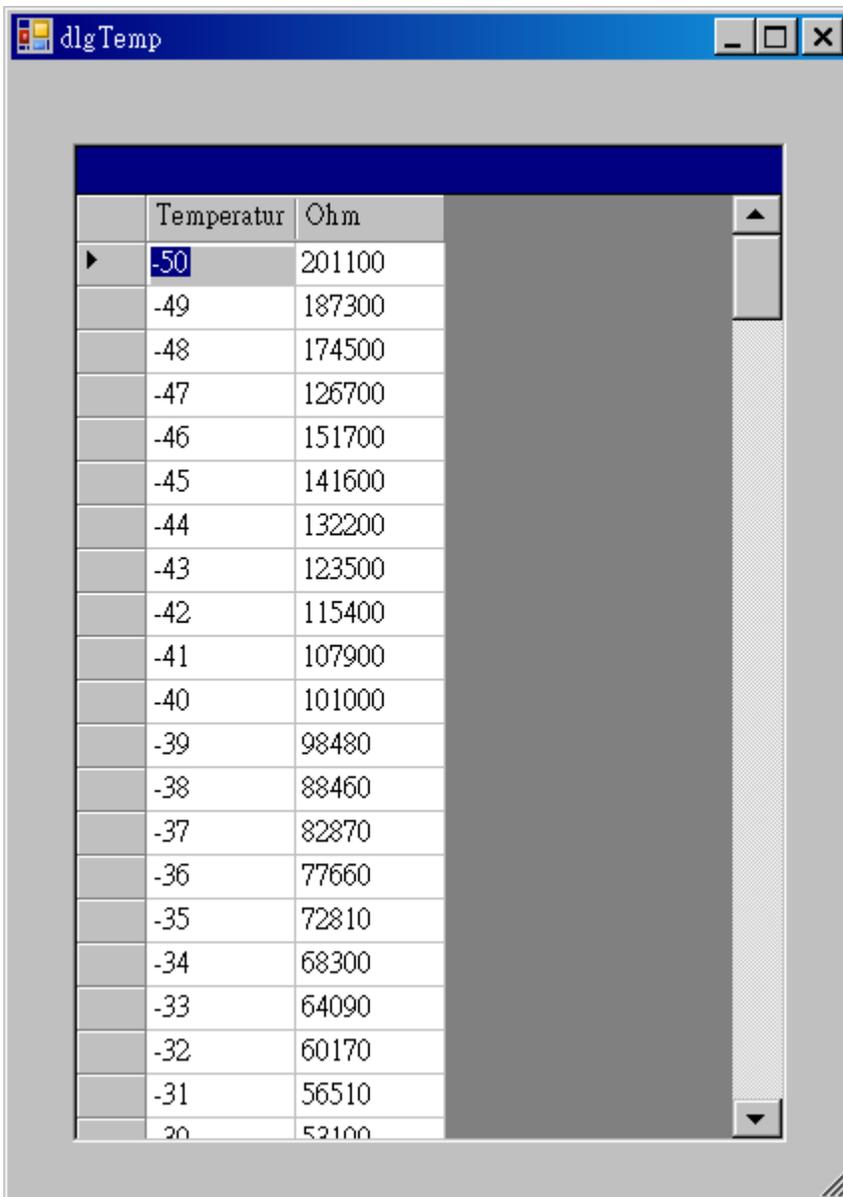
Temperatur	Ohm
-50	201100
-49	187300
-48	174500
-47	126700
-46	151700
-45	141600
-44	132200
-43	123500
-42	115400
-41	107900
-40	101000
-39	98480
-38	88460
-37	82870
-36	77660
-35	72810
-34	68300
-33	64090
-32	60170
-31	56510
30	53100

To import this temperture table into the i-87089, please click on "Upload" .
Then after a successful or failed message will show up in the bottom of the below windows.
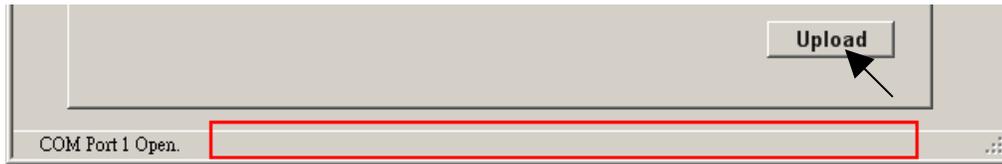
To create a new temperature table file, user can copy this "GeoKon_kv4100_4150.csv" to one another file name. For example, to be "NewTable2.csv" , then edit it. Then importing it by the VW Utility into i-87089.

Each i-87089 can be imported max. 8 temperature table files inside in advance. The file number will be 1 to 8 . This file No. is the number used in the "ISaGRAF I/O connection > i_87089 > Freq > TemperFile_01_08 ~ TemperFile_25_32" listed in section 1.1 .

Step 4:

When the import is done, please exit the VW Utility. Then switch off the power of the ISaGRAF PAC. Plug out the i-87089 and remove the connected CA-0904 cable. Then this i-87089 will work if it is plug into the ISaGRAF PAC with the program running as listed in the section 1.1.

Note:
1. The Wincon-8xx7 doesn't have slot No. 0, Its leftmost slot No. is 1 .
2. The i-8437-80 / 8837-80 and i-8417 / 8817 controllers support only max. 4 pcs. of i-87089 in the slot No. of 0 ~ 3 .