Hand-held Multifunction Reader

VH301

Operating Manual

WINCONN TECH

Overview

Thank you for choosing our VH301 multifunction reader. This device is a hand-held reading device developed for vibration wire sensor，It has a wide range of sensor compatibility， It can be used to measure frequency, temperature, voltage sensor, current sensor and store measurement data， Simultaneous measurement of various environmental physical quantities (ambient temperature and humidity, atmospheric pressure, air quality)，Real-time clock, position data and sensor data correspond one by one，Built-in FLASH can store millions of pieces of data，The compact size of the equipment and the use of AAA batteries and other features are convenient to carry and replace batteries。The additional functions of wireless communication and timing switch provide convenient conditions for automatic and unattended monitoring.

Order Information

TYPE	NAME	Functional Description
VH301B	Basic ver	Vibrating wire sensor reader,Manual and automatic working modes
VH301F	Fully fun ver	VH301B+Environment(E)+ Analog Measurement (Ax)+GPS(P)+ Compass(O)
VH301P	Plus ver	VH301F +U Disk(U)+ wireless（Rx&G）

Standard parts of delivery

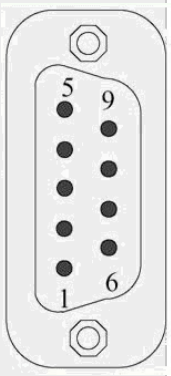
- ✓ 1 Hand-held reading instruments(VH301X)
- ✓ 1 Portable bag
- ✓ 1 Connector for Measure
- ✓ 1 Connector for Communication
- ✓ 1 Operation manual (this manual)
- ✓ 1 Software tools (electronic version)

Device parameters

Parameter	Condition		Range	Unit
Size	165x82x31（LxWxH）			mm^3
IP grade	IP53			
Power supply	AAA batteries * 4			
Temperature	Operating Temperature		-20~80	℃
	Storage Temperature		-60~120	
Runing Hour	NO GPS	ALK1300mAH	≥8	H
		NI-MH900mAH	≥8	
		Li1500mAH	≥10	
screen resolution	128x128			pix^2
internal memory	EEPROM		512	kByte
	FLASH		8	MByte
external memory	U disk		1~32	G
Range	Vibr wire frequency		100~8000	Hz
	Vibr wire temperature		-60~120	℃
	Environmental temperature		-40~125	℃
	Environment Humidity		0~100	%
	Atmospheric pressure		10~1200	mbar
	Air quality-VOC		0~1000	ppb
	Air quality-CO2		400~5000	ppm
	Voltage sensor		0~10	V
	Current sensor		0~20	mA
	Tilt measuring		±90	°
precision	Vibr wire frequency		±0.2	Hz
	Vibr wire temperature		±0.5	℃
	Environmental temperature		±0.3（0~60℃）	℃
	Environment Humidity		±3（25℃）	%
	Atmospheric pressure		±0.01	mbar
	Air quality-VOC		45	ppb
	Air quality-CO2		50	ppm
	Voltage sensor		0.1	%
	Current sensor		0.1	%
	GPS（Horizontal）		3	m
	GPS（elevation）		10	m
	Compass azimuth		1.5	°
	Tilt measuring		0.01	°

- # Device Composition and Interface Definition

Front View Back View

Connector		Color	Function	Connect To	
measuring line①	9	RED	Coil+	Coil+	
	4	BLACK	Coil-	Coil-	
	6	YELLOW	NTC+	NTC+	
	4	BLUE	NTC-	NTC-	
communication line②	2	YELLOW	RS232-RXD	Computer RS232 interface	
	3	BLUE	RS232-TXD		
	5	BLACK	GND		
	7			485-A/VOUT+	
	8			485-B/VOUT-	

Note 1: The measuring data line has high voltage output, and direct contact with exposed parts should be avoided during the measurement.
Note 2: Special connectors must be used to connect to the computer RS232 interface。

Key Operation

VH301 has two capacitive touch buttons, [POW] and [SET], with three events: click, double-click, and long press。

- Click: press and release buttons for a short period of time.
- Double-click: you complete two clicks in a short period of time.(default range of 100 milliseconds to 1 second).
- Long press: press the button and hold for a while before releasing.(default minimum time length of 3 seconds)

Note: The length of double-click and long-press is defined by the register parameters. Please refer to the registers description file for more details.

Normal mode buttons operation			
Events	**Button Name**	**Functional Specification**	**Remarks/Conditions**
Long press	[POW‹‹]	Turn on and off	
	[SET››]	Save a set of data	Measure Pages
Double-click	[POW‹‹]	Switch to the previous page	
	[SET››]	Switch to the next page	
Click	[POW‹‹]	Switch the screen backlight	
	[SET››]	Switch between the home page and the Settings page	
Note: in the parameter setting page, long press the "setting" button to enter the setting mode			
Set mode buttons operation			
Events	**Button Name**	**Functional Specification**	**Remarks/Conditions**
Long press	[SET››]	Switch between set mode and normal mode	Parameter setting page
	[POW‹‹]	Continuously change parameter values	Parameter setting mode
Double-click	[SET››]	Select the next parameter item	
	[POW‹‹]	Select the previous parameter item	
Click	[SET››]	Change to the next parameter value	
	[POW‹‹]	Change to the previous parameter value	
Note: When setting mode, the backlight and power off function cannot be used.			

Indicator Light Description

Indicator		Color	Status	Description
POW	POW	red	off	
			on	
RUN	RUN	green	flash	running
SEN	SEN	yellow	fast①	Is waiting for the vibration wire sensor access
			slow②	Measuring frequency
SIG	SIG		---	Functions are not yet defined
Note①：More than 5 flashes per second **Note②：The measurement flashes once every time**				

Excitation Voltage and Method of Vibrating Wire Sensor

Tap Position	Multitap switch	
	Excitation voltage source	Excitation method
0	4.5V	High voltage excitation, limited voltage 120V①
1	5.5V	High voltage excitation, limited voltage 150V①
2	6.5V	High voltage excitation, limited voltage 200V①
3	7.5V	Frequency feedback fixed frequency sweep method（High vol②）（Recommend）
4	8.5V	Frequency feedback gradient frequency sweep method（High vol②）
5	9.5V	Frequency feedback fixed frequency sweep method（Low vol ③）（Recommend）
6	10.5V	Frequency feedback gradient frequency sweep method（Low vol ③）
7	11.5V	Piecewise frequency sweep 1,300Hz~1500Hz
8	12.5V	Piecewise frequency sweep 2,1500Hz~2700Hz
9	13.5V	Piecewise frequency sweep 3,2700Hz~3900Hz
A（10）	14.5V	Piecewise frequency sweep 4,3900Hz~5100Hz
B（11）	15.5V	Full frequency sweep,300Hz~5000Hz
C（12）	16.5V	Undefined
D（13）	17.5V	Undefined
E（14）	18.5V	Undefined
F（15）	19.5V	Undefined
Note①：The excitation voltage source shall be greater than 5V.High vol excitation may damage the sensor coil, please consult the sensor manufacturer first. **Note②：When the measured frequency value is not ideal, it is automatically**		

switched to high voltage pulse excitation, and the high voltage limit is 200V.
Note③：When the measured frequency value is not ideal, it is automatically switched to the full frequency sweep, and the excitation voltage source voltage is the sweep voltage.

Basic Parameters Setting

Parameter setting must be completed under "parameter setting mode". The methods of entering and exiting the parameter setting mode are: Long press the [SET] button on the parameter setting page. When the parameter value is displayed in reverse color, it indicates that the "parameter setting mode" has been entered.

➢ Enter Parameter Setting Mode

Switch to the Settings page by double-clicking the [POW] or [SET] button.

Press the [SET] button for a long time until the first parameter on this page is the backcolor display status.

➢ Select the Parameter to Modify

By double-clicking the [POW] or [SET] button, select the parameter to be modified (the parameter value is displayed in reverse color).

➢ Modify Selected Parameter Value

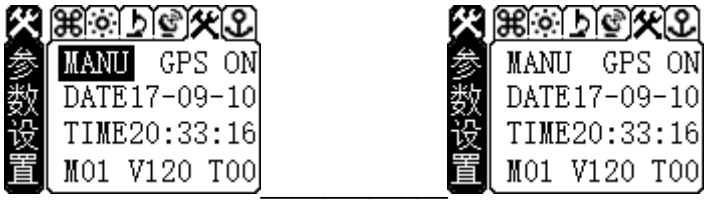
When a parameter is selected, click the [POW] or [SET] button to modify the current value.

Note: Long press the [POW] button can realize rapid and continuous modification of parameter value.

Note: Only click on the modified parameters can be saved permanently.

➢ Exit Parameter Setting Mode

Press the [SET] button for a long time until there is no backdisplayed parameter on this page, indicating that the parameter setting mode has been quit.



Setting mode **Normal mode**

- [MANU/ AUTO]: Whether the device works in automatic timing mode.When working in automatic mode, it automatically starts every hour, collects and stores once, and sends every two hours.
- [GPS ON/OF]: Whether to use GPS positioning function (more power consumption).
- [DATE]: Date values within the device. The date time value is saved to the data file when the data is stored.
- [TIME]: Time values within the device. The date time value is saved to the data file when the data is stored.
- [T]: Type of internal temperature sensor of vibration wire sensor.

  0: no temperature sensor (real-time measurement of CPU temperature).

  1~ 9:1 k~9k thermistor. The default k value is 3950.Please consult technical support for modification.

  10: DS18B20 digital temperature sensor. Please consult technical support for the connection method.

Export data to computer

Stored data can be exported to a computer for saving and editing via the RS232 interface.

■ Download data file

- Connect the handheld reading device to the RS232 port of the computer with the dedicated data cable;
- Open the file synchronization tool filesync.exe, select the computer port name, and click the "open" button;
- Open VH301 and click the "enter DOS" button of the synchronization tool and click the "synchronize" button.
- Click the "dat" directory on the left of the synchronization tool, and all data files in this directory are displayed on the right side of the interface.
- Select the name of the file you want to download, and click the button of download icon to pop up the dialog box for saving the file;
- Click the "save" button to complete the data file download.

■ Open data file

You can use notepad or Excel to open the data file downloaded above.The steps to open a data file using Excel are as follows.

- Open the Excel software, click [file] - [open] on the main menu, and browse to the directory where the data file is located. Select "all files (*.*)" as the file type;
- Click the data file "dat_xxx.txt" and click the "open" button to pop up the dialog box of file import wizard;
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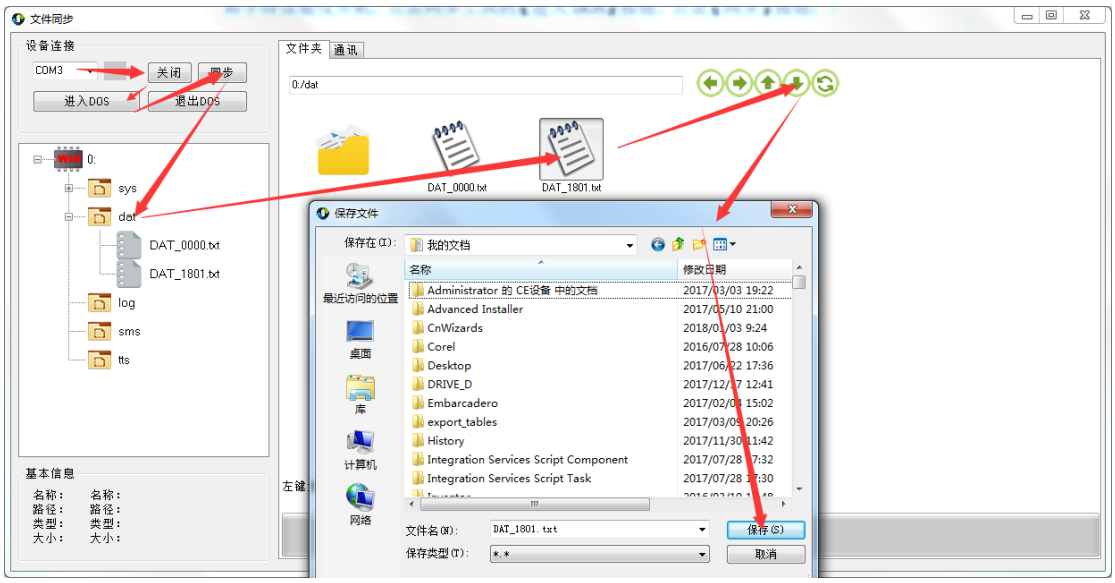
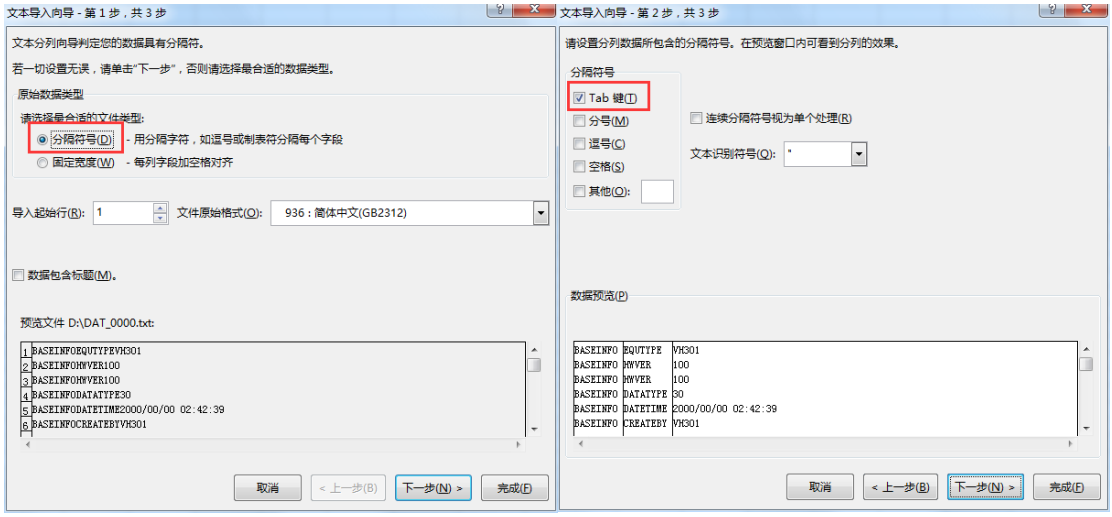
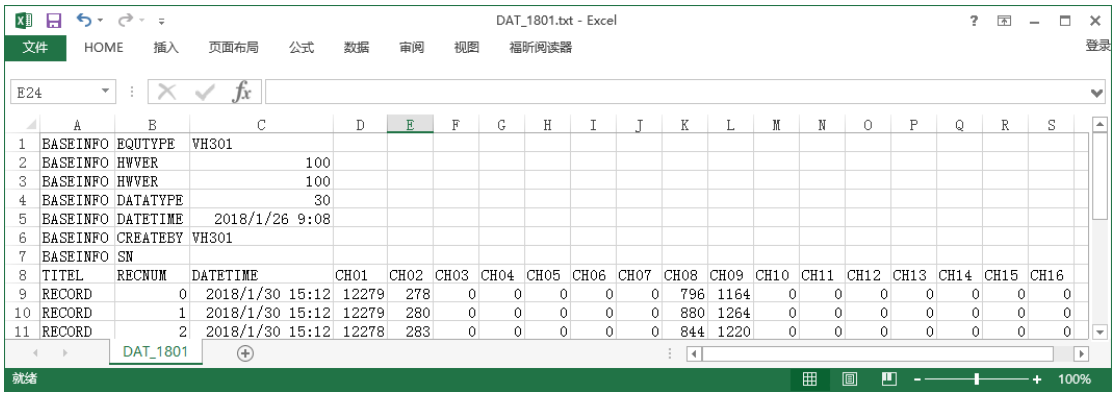
- Select "separator" and "TAB" in turn, and click the "finish" button to open the data file.



Download data file





	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	BASEINFO	EQUTYPE	VH301																
2	BASEINFO	HWVER	100																
3	BASEINFO	HWVER	100																
4	BASEINFO	DATATYPE	30																
5	BASEINFO	DATETIME	2018/1/26 9:08																
6	BASEINFO	CREATEBY	VH301																
7	BASEINFO	SN																	
8	TITEL	RECNUM	DATETIME	CH01	CH02	CH03	CH04	CH05	CH06	CH07	CH08	CH09	CH10	CH11	CH12	CH13	CH14	CH15	CH16
9	RECORD	0	2018/1/30 15:12	12279	278	0	0	0	0	0	796	1164	0	0	0	0	0	0	0
10	RECORD	1	2018/1/30 15:12	12279	280	0	0	0	0	0	880	1264	0	0	0	0	0	0	0
11	RECORD	2	2018/1/30 15:12	12278	283	0	0	0	0	0	844	1220	0	0	0	0	0	0	0

Open data file

■ Data file description

All data are stored in the form of channels, with a total of 24 channels, which are defined as follows:

- CH01: Frequency value of vibrating wire sensor.Unit:0.1Hz
- CH02: Temperature value of vibrating wire sensor.Unit:0.1℃
- CH03: Environment temperature.Unit:0.1℃
- CH04: Environment Humidity.Unit:0.1%
- CH05: Atmospheric pressure, unit: 0.01kP
- CH06: Air quality VOC, unit: PPM
- CH07: Air quality CO2, unit: PPB
- CH08: Extended measure ADC1
- CH09: Extended measure ADC2
- CH10: GPS longitude - degree. Unit: °
- CH11: GPS longitude – minute. Unit: ′
- CH12: GPS longitude - second. Unit: 0.01″
- CH13: GPS latitude - degree. Unit: °
- CH14: GPS latitude - minute. Unit: ′
- CH15: GPS latitude - second. Unit: 0.01″
- CH16: GPS elevation. Unit:0.1M
- CH17: Azimuth Angle, unit: 0.01 degree (0 degree north, clockwise increase)
- CH18: Tilt-x, unit: 0.01 degree(The slope to the right is positive and the reverse is negative)
- CH19: Tilt-y, unit: 0.01 degrees(The forward tilt is positive and the reverse tilt is negative)
- CH20~CH20: Reserved, not used

Notes

- **Use standard battery:** It is recommended to use alkaline battery to power the equipment. The use of other batteries will cause the battery residual power display error or fail to turn on or off normally.
- **Long-term storage requirements:** When not in use for a long time, please take out the battery. The equipment should not be placed in moist, high temperature or low temperature environment for a long time.
- **Keep the keys clean:** The key of this equipment is capacitive button. Keep the button areas clean during use to avoid water stains or sweat stains.
- **Use special interface:** Whether it is sensor measurement or computer connection, please use the special interface signal line or data line of this equipment.
- **Data export in time:** After storing data, it should be exported to the computer in time and clear the storage space. Too much data stored in the device will affect the operating efficiency.
- **Periodic calibration and verification:** The equipment has been calibrated when it leaves the factory, and it is recommended to return to the factory for re-calibration every year.
- **No short connection line:** No short connection of any two measuring lines or clamps.
- **Correct connection:** Avoid contact with non-sensor signals. Incorrect connection may lead to permanent damage of equipment.
- **Avoid static electricity breakdown:** When used in dry environment such as autumn and winter, special attention should be paid not to introduce static electricity into the equipment.
- **Do not disassemble:** Do not disassemble or refit equipment.