

VFT-510 series Differential Pressure Transducer

Instruction Manual

Relative & Differential Pressure and wind velocity measurement

VFT-512 : Low Differential Pressure Transducer

VFT-513 : High Differential Pressure Transducer

A. Specifications

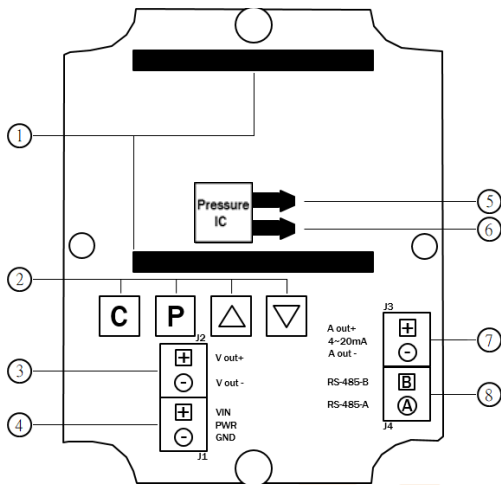
Model No.		VFT-512	VFT-513
Measuring Range	Differential Pressure	$\pm 7000\text{Pa} / \pm 700\text{mmH}_2\text{O} / \pm 70\text{mbar}$	$\pm 99000\text{Pa} / 9900\text{mmH}_2\text{O} / 1000\text{mbar}$
	Wind Speed	0~100m/s (via Pitot tube)	0~210m/s (via Pitot tube)
Resolution	Differential Pressure	1Pa / 0.1mmH ₂ O / 0.01mbar	10Pa / 1mmH ₂ O / 0.1mbar
	Wind Speed	0.1m/s	1m/s
Accuracy (at 25°C)		$\pm 0.25\%$ F.S、TEB<1% ※TEB : Total Error Band	
Measurement Unit		Differential Pressure : Pa、mbar、mmH ₂ O switchable Wind Speed : m/s Temperature : °C、°F switchable	
Media Compatibility		Dry air or non-corrosive gases and liquids	
Display and Functions		LCD display (4-digital), The functions can be displayed : Relative pressure. Differential Pressure、Wind Speed、Temperature、Measurement Unit	
Sampling Rate		Approx. 0.5 sec.	
Output Signal		Analog Output : 4 ~ 20mA / 0 ~ 5V or 0 ~ 10Vdc ※The initial setting range is ± 7000 Pa, 4-20mA and 0~5Vdc ※Output of wind speed is 0~100m/s, the minimum reading is 1.2m/s	
		Digital Output : RS-485 / Modbus RTU protocol (Wind Pressure、Temp. simultaneously)	
Auto temp. compensation		0 ~ +60°C (+32°F ~ +140°F)	
Measurement range setting		The user can set the measuring range by setting button ※The Initial is ± 7000 Pa for the type VFT-512 / ± 99000 Pa for the type VFT-513 ※The wind speed can't set the measurement range	
Calibration		Zero & Span adjustments and Zero setting	
Baud Rate		9600	
Over Pressure		2 times FSP	2,000Kpa (300psi)
Operating Environment		0 ~ +55°C (+32 ~ +131°F), 0~95%RH non-condensing	
Storage Environment		-20 ~ +60°C (-4 ~ +140°F), 0~95%RH non-condensing	
Power Supply		DC 9~32V, $\geq 150\text{mA}$ (Max. DC36V)	
Dimensions / Weight		110(L) × 80(W) × 48(D)mm (4.33 × 3.15 × 1.89 inches) Not including the pressure hose connector & cable gland ; Approx. 215g	
Approvals		RoHS, CE, IP65	

※0-10V of output needs, 15VDC of power supply.

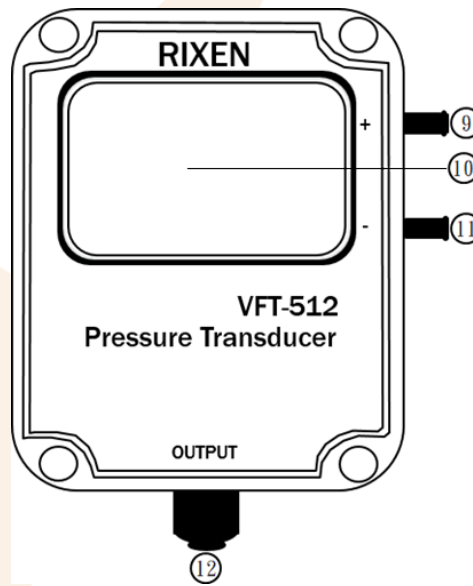
	Pa↕	Kpa↕	mbar↕	mmH2O↕	mmHg↕	inH2O↕	PSI↕
Pa↕	1↕	0.001↕	0.01↕	0.10197↕	0.007501↕	0.004016↕	0.000145↕
Kpa↕	1000↕	1↕	10↕	101.9716↕	7.501↕	4.016↕	0.145↕
mbar↕	100↕	0.1↕	1↕	10.1972↕	0.7501↕	0.4016↕	0.0145↕
mmH2O↕	9.807↕	0.009807↕	0.09807↕	1↕	0.0734↕	0.0394↕	0.001422↕
mmHg↕	133.3↕	0.1333↕	1.333↕	13.62↕	1↕	0.5362↕	0.0193↕
inH2O↕	249.1↕	0.2491↕	2.491↕	25.4↕	1.865↕	1↕	0.0361↕
PSI↕	6895↕	6.895↕	68.948↕	704.3↕	51.71↕	27.73↕	1↕

B. Instrument Description

Wiring Diagram



External Diagram







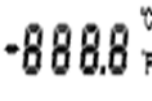



































- ① Pin display
- ② Setting buttons
- ③ DC Voltage Output : 0 ~ 5V 、 0 ~ 10V (Selectable)
- ④ Power Supply : 12 ~ 30VDC (≥ 150mA)
- ⑤ Pressure sensor connect with ⑨
- ⑥ Pressure sensor connect with ⑪
- ⑦ DC Current Output : 4 ~ 20mA
- ⑧ Digital Output : RS-485 / Modbus
- ⑨ Pressure terminal (+)
- ⑩ LCD display
- ⑪ Pressure terminal (-)
- ⑫ Waterproof terminal block

※Please make sure the pressure terminal(⑨ 、 ⑪) be tight connected with signal connections.

※Please fasten the outer casing and terminal block(⑫) to make sure the functions of waterproof and dustproof.

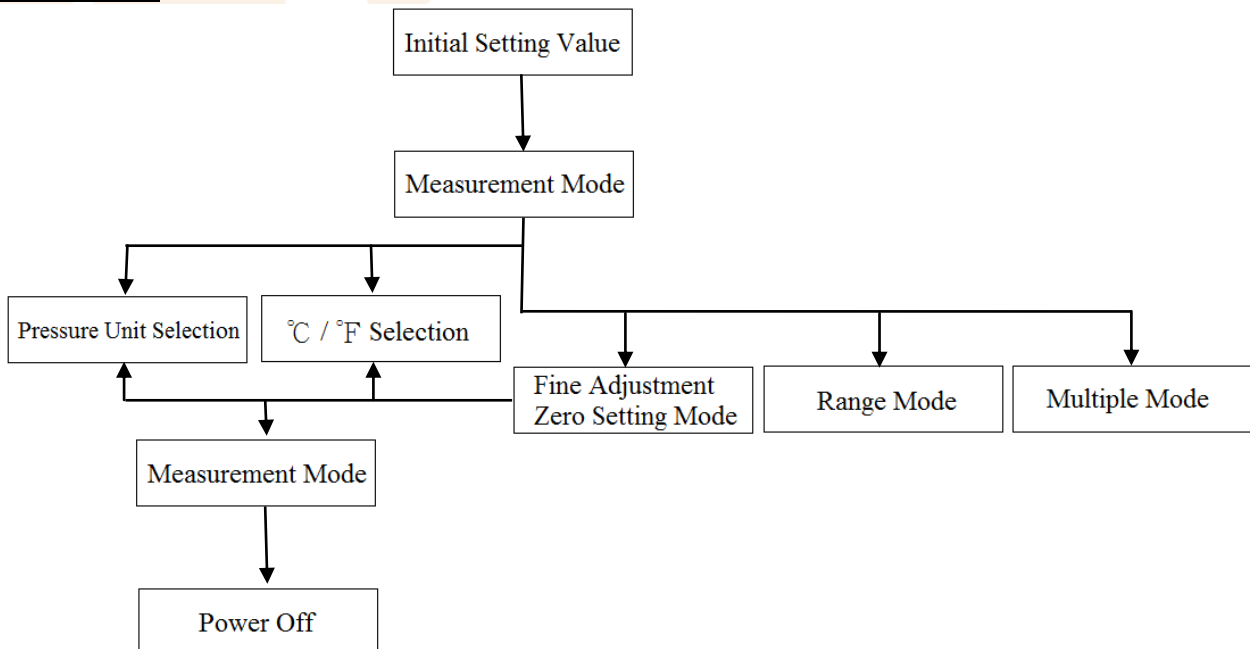
C. Key Description ※When you turn off the instrument and start again, it will revolve to the initial setting.

Key	Function	Description	LCD display
 (3S)	Confirm (OK) Button	Press the  button to complete the all of setting.	
	°C / °F Selection Button	Press the  button and hold 3 second, the temperature and the temperature unit will flash. Then you can press the  to select the temperature unit and press the  to save.	
 (3S)	Pressure Unit Selection Button	Press the  button and hold 3 second, the pressure and the pressure unit will flash. Then you can press the  or  to select the pressure unit and press the  to save.	
 (3S)	Multiple Setting	On the measurement mode, press the  button and hold 3 second, the displayed value, % and CAL will flash. Then you can press the  or  to set the multiple (Max. 200%) and press the  to save.	
	Up / Adjusting Key	On the fine adjustment, Multiple and measuring range setting mode, press the  to increase the value or up-regulation.	
 (3S)	Fine Adjustment	On the measurement mode, press the  button and hold 3 second, the displayed value and CAL will flash. Then enter the fine adjustment mode, you can press the  or  to adjust the deviation and press the  to save.	
	Zero Button	On the fine adjustment mode, press the  and  simultaneously. If the displayed value appears “0000”, the zero setting is completed. At this time, the instrument comes back to the measurement mode.	
	Down / Adjusting Key	On the fine adjustment, multiple and measuring range setting mode, press the  to decrease the value or down-regulation.	
 + 	Measuring Range Setting	On the measurement mode, press the  and  simultaneously, the displayed value, unit(pa) and CAL will flash. Then, you can press the  or  to set the measuring range (It be increased or decreased by 100 times as basis) and press the  to save.	

※For the VFT-512, the max setting range is 7000Pa and the min setting range is 100Pa.

For the VFT-513, the max setting range is 99,000Pa and the min setting range is 1000Pa.

D. Flowchart

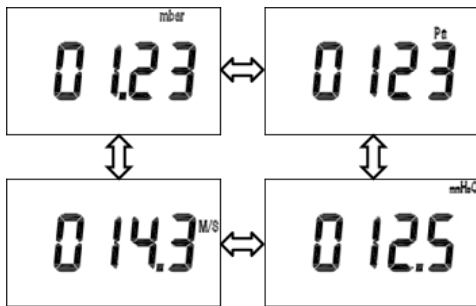


E. Operating Instructions

On the measurement mode, Press the **C** **P** **▲** **▼** to enter the setting mode. (Refer the “C. Key Description”)

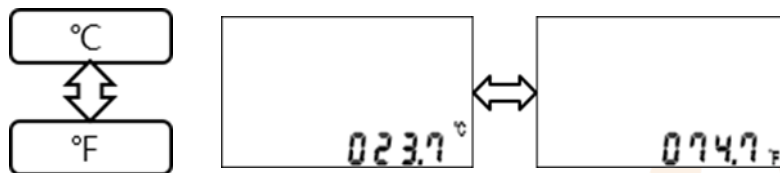
E-1 Pressure Unit Selection :

On this mode, press the **▲** or **▼** to set the pressure unit and press the **C** back to the measurement mode.



E-2 Temperature Unit Selection :

On this mode, press the **▼** to set the temperature unit and press the **C** back to the measurement mode.



E-3 Multiple Setting :

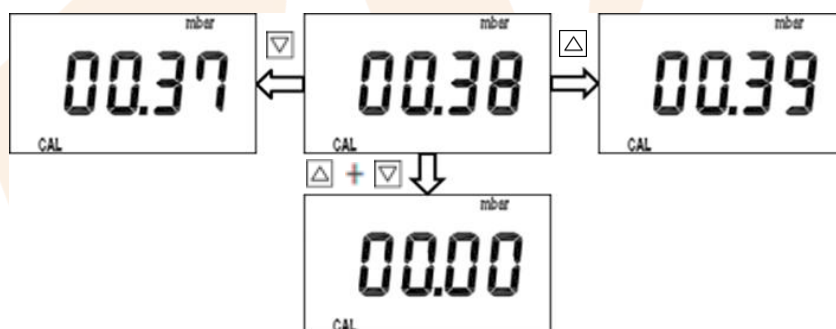
On this mode, press the **▲** or **▼** to set the multiple and press the **C** back to the measurement mode.

※If the multiple over 200 or lower than 0, it will comes 100.



E-4 Fine Adjustment & Zero Setting :

On this mode, press the **▲** or **▼** to adjust the pressure value or turn to zero for the pressure value. Then press the **C** back to the measurement mode. ※The result of fine adjustment will not change the multiple setting.

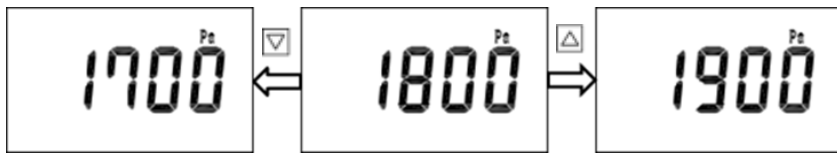


E-5 Measuring Range Selection :

On this mode, press the **▲** or **▼** to set the measuring range and press the **C** back to the measurement mode.

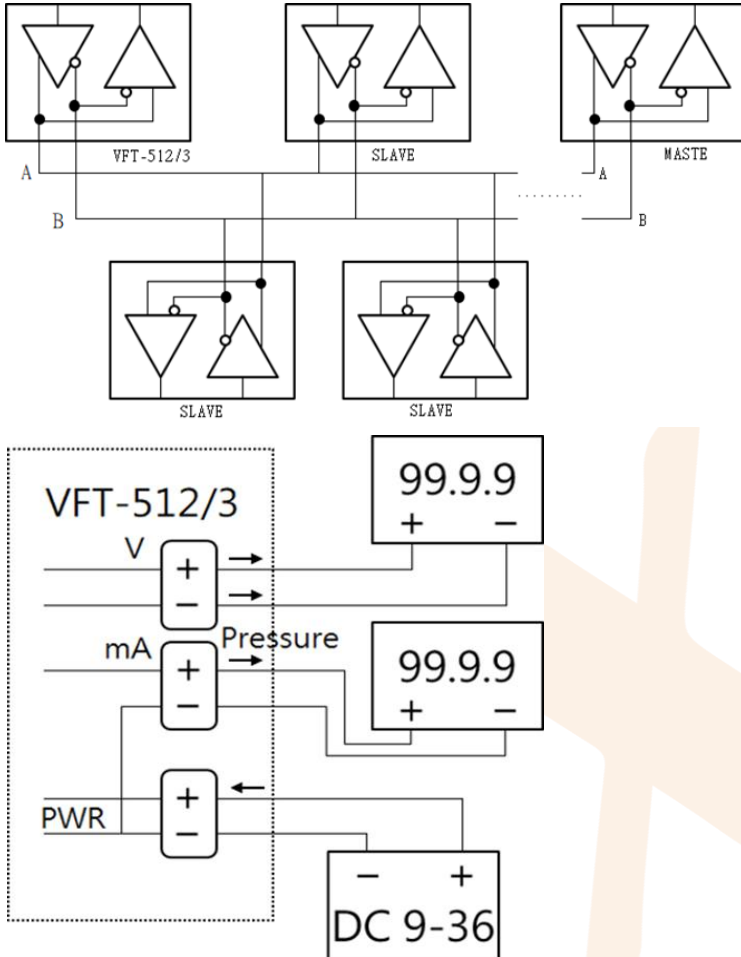
※If it over the measuring range, the instrument will turns back to the initial setting automatically .

Example: The measuring range of VFT-512 over 7000, it will becomes 100. The measuring range of VFT-512 lower than 100, it will becomes 7000.



F. Connecting Diagram

F-1 RS-485 / Modbus RTU output : ※VFT512 and VFT-513 includes 1K resistance for noise immunity .



G. RS-485 transfer protocol

RS-485 transmission end is half-duplex transmission; it needs the shielded twisted pair to receive.

On the 9600bps, the maximum transmission distance standard is 1200M (it still depends on the environmental factor).

Baud rate: 9600

Transfer status: / 8 / N / 1

Transfer content: (8BIT)

Read Holding Registers by Function 03H

G-1 Request Data Frame

Read the pressure, temperature and parameter.

Slave address	Function	Starting address Hi	Starting address Lo	No. of Byte Hi	No. of Byte Lo	CRC Lo	CRC Hi
11H	03H	00H	00H	00H	06H	87H	59H

G-2 Response Data Frame

Response value = 11-Byte (includes the position command CRC)

Slave address	Function	Byte count	Data-Pre 【15:8】	Data-Pre 【7:0】
11H	03H	06H	12H	34H

Data-Tem 【15:8】	Data-Tem 【7:0】	Data-Par 【15:8】	Data-Par 【7:0】	CRC Lo	CRC Hi
00H	FAH	00H	01H	8CH	F2H

Data-Pre 【15:0】 is pressure value $0 \times 1234 = 4660$ (the real value needs to refer the parameter)

Data-Tem 【15:0】 is temperature value $0 \times 00FA = 250$ (the real value needs to refer the parameter)

Data-Tem 【15:0】 is parameter value $0 \times 0001 = 1$ (【15:3】 no value)

【1:0】 is considered as pressure and wind pressure >>>> 00 is mbar (the real value is 46.60)
 >>>> 01 is pa (the real value is 4660)
 >>>> 10 is mmH₂O (the real value is 466.0)
 >>>> 11 is m/s (the real value is 466.0)

【2】 is considered as temperature unit >>>> 0 is °C (the real value is 25)
 >>>> 1 is °F (the real value is 25)

The reading is 4660pa 25°C (the above is the positive value.)

G-3 Response Data Frame

Response value = 11-Byte (includes the position command CRC)

Slave address	Function	Byte count	Data-Pre 【15:8】	Data-Pr 【7:0】
11H	03H	06H	FFH	81H

Data-Tem 【15:8】	Data-Tem 【7:0】	Data-Par 【15:8】	Data-Par 【7:0】	CRC Lo	CRC Hi
02H	C4H	00H	07H	F6H	23H

Data-Pre 【15:0】 is pressure value $0 \times FF81 = -127$ (the real value needs to refer the parameter)

Data-Tem 【15:0】 is temperature value $0 \times 02C4 = 708$ (the real value needs to refer the parameter)

Data-Tem 【15:0】 is parameter value $0 \times 0007 = 7$ (【15:3】 no value)

The reading is -12.7m/s 70.8 °F (the above is the negative value.)

Conversions and Formulas : $1\text{pa} = 0.01\text{mbar} = 0.102\text{mmH}_2\text{O}$ 、 $\text{m/s} = (\text{mmH}_2\text{O}^{1/2}) \times 4.04$

H. Precautions

1. This instrument must only be operated within its specifications, or it will be damaged.
2. This instrument has waterproof and dustproof function; please do not use it in a high temperature environment or with corrosive materials to avoid leakage or damage.
3. When the LCD displays the pressure, it is pressure output. The same situation as the wind speed.
4. On the measuring wind pressure, wind speed and temperature, because the unstable temperature environment or tube pressure, please multiple sampling or extend the capturing for the signal interval.
5. Use the original pitot tube is suggested for the more accurate measuring value.
6. When the instrument is not use for a long time, please keep it and the all accessories in a dry environment, also please avoid direct sunlight.
7. If there are any operation questions or malfunction, please contact your local distributor or our service department.