Software VA 7/96

Notes for the user
Operating instructions

for evaluation units µP-Vortex, VTP-VA, VT-VA und VP-VA
for Vortex flow sensors VA

	1V	2V	xV	NV	
for 1-channel instruments µP-Vortex	●				● Standard ○ Option
for 2-channel instruments µP-Vortex		●			+ on request
for multichannel instruments µP-Vortex			●		
for instruments VTP-VA, VT-VA and VP-VA determining standard volume flow				●	
Measured value display Instantaneous measurements every two seconds	●	●	●	●	**v = 15,92 m/s**
Selective display of flow velocity or volume flow	●	●	●		**V/t = 234,6 cbm/h**
Measured value selective display also for simultaneous display of v and V/t	●				**v = 12,53 m/s** **V/t = 234,6 cbm/h**
Display of measured value and measurement point from one measurement point at a time			●		**channel 4** **v = 09,30 m/s**
Measured value display simultaneously from measurement point 1 and 2		●			**v1 = 16,33 m/s** **v2 = 07,83 m/s**
Display units					
m/s and **cbm/h**, selectable	●	●	●	●	
m/s, **km/h** and **cbm/h**, selectable	○	+	+	+	
Operator assistance	●	●	●	●	

After switching-on the instrument a **self-presentation** appears for a few seconds.

Höntzsch Instruments
µP-Vortex version 2.0

After the self-presentation the **measured value display** appears automatically.
Microprocessor-controlled instruments (µP-instruments) with keypad and alphanumeric display are dialog orientated. The Software is organized in such a way that instrument operation is possible, to a large extent, without reading the notes for the user. The key | ➔ | leads through the **menu technique**.

During measured value diplay the menu can be called up with key | ➔ | and moved forwards with | ➔ |. With key | C | the measured value display can be reached again. Setting the desired functions and parameters, so-called instrument configuration, is carried out during measured value display or in the menu by operating the digit key displayed in the menu.

Then the information that the system requires can be entered in order to carry out specific

functions.

Operating instructions, status display and error warnings corresponding to Software.

key ‘4’ =
Calibration Code

1V	2V	xV	NV
●	●	●	●

● Standard ○ Option
+ on request

Control keypad
Keys | 0 |, | 1 |, ... | 9 | (digit keys) are used for entering numeric symbols as well as alphanumeric symbols, as for example, the calibration code KKZ etc. Input of the alphanumeric symbols A to F is carried out by operating two digit keys in succession:

10 = A, 11 = B, 12 = C,
13 = D, 14 = E, 15 = F

Keys | 0 |, | 1 |, ... |9| can also be used for calling specific menu points and instrument functions.

Calibration Code
Code = 87D4A797 (XX)

The menu can be scanned with the | ➔ | key. Within an input field, in which a preliminary entry has been made, operation of the | ➔ | key is ineffective.

Instructions
next = '➔' end 'C'

Unsuitable inputs, which can be recognized as unsuitable, will be rejected.

Inputs, parameters and measurement data

Key | C | can be used within the menu to call up the measured value display. Within an input field in which at least one but not all character inputs have been made, operation of key | C | makes clearance of previously entered symbols possible.

are non-volatile memorized, i.e. they are available after turning OFF/ON or after power supply interruption. A flashing cursor marks the place on the input field where inputs are to be entered.

Letters A...F with input

10 = A
11 = B
...
15 = F

If after calling up a menu point or after input, 30s pass without key operation, the measured value display will automatically appear.

Two-digit inputs: digits 0...9
with input 00 = 0
01 = 1
...
09 = 9

The text shown on the display assists in finding the desired option. Previous inputs / settings will be displayed.

Analog output / outputs
Output signal swing corresponding to Hardware. Instantaneous values corresponding to the processing cycle, mostly every second, in the case of extensive Software, every two seconds.

Required Hardware: analog output v

Analog output v

●	●	●	●

analog output I = 20 mA
v = 20,00 m/s

Output value: actual flow velocity

Output signal:

● +	● +	● +	● +

scalable, configurable, expandable

Output RS·232·C / V24
Required Hardware: Output RS 232 C / V24

1V	2V	xV	NV
●	+	+	●

● Standard + on request

Data is transmitted every second or, in the case of extensive Software, every two seconds (= processing cycle).

At the beginning of each transmission-
on the RTS-output is set at „O". After
this and between 6 or more ASCII characters per transmission value, the CTS-input must not be set at „1" for longer than 10 ms, otherwise the transmission will be stopped and re-started after the next processing cycle.

Should just **one measurable value** be transmitted from **one measurement point**, e.g. flow velocity v, each measured value consits of 6 ASCII characters:

1 sign +, - or blank
4 digits
1 decimal point

Should just **one measurable value** be transmitted from **more than one measurement point**, each measured value, consisting of the above mentioned 6 ASCII characters, has 1 ASCII character in addition as code.

Should just **one measurable value** be transmitted from **one measurement point**, and if this value should be volume flow, then each measured value consists of 9 ASCII characters:

1 sign +, - or blanc
8 characters (digits, blancs and decimal points

Should volume flow be transmitted from more than one measurement point, then each measured value has in addition 1 ASCII character as code.

Coefficient/Profile factor
(BW=PF)

●	●	●	●

Setting range of the velocity coefficient: 0.001 ... 9.999.

profile factor
BW = 1.000

In larger free-jet wind tunnels as well as in larger tunnels and measuring tubes, the **local velocity v_p**will be displayed with **PF = 1.000**.

PF is also used to calculate the local velocity v_p to the average velocity v_m in measurement cross sections:

$$v_m = v_p \bullet PF$$

This relation is vaid for the actual flow velocity as well as for th standard flow velocity.
v_m is displayed. The display value also corresponds to v_p if
PF = 1.000 is set. v_m is the output value also at the analog output or

The volume flow results from the mean flow velocity and the measurement cross-section.

$$\dot{V} = v_m \bullet section$$
$$\dot{V} = v_p \bullet PF \bullet section$$

When carrying out **measurements with Vortex flow sensors VA** in circular measurement cross-sections with nominal width of ≈80 mm to ≈400 mm the corresponding coefficients PF determined by Höntzsch are set to calculate the average velocity.

When carrying out measurements with Vortex flow sensors
in larger measurement cross-sections a preexamination of flow profile is to be carried out with PF = 1.000. As a result of this examination an optimal measurement point is to be determined and the corresponding coefficient is to be set. For further information please consult VDI/VDE 2640, „Measurement of velocity area methods in flow cross-sections."

Warning!
Before measuring always check the profile factor setting.

RS232-output.

	1V	2V	xV	NV	
Inner diameter of measuring pipe Di Setting ranges Di: 000.1...999.9 mm and 0001...9999 mm. Di is for calculating the actual flow rate: $\dot{V} = \frac{v_m \cdot \pi \cdot Di^2}{4}$ At the analog output v_m respectively the volume flow remains the output value. If the measurement cross-section is not circular but, for example, rectangular, then the equivalent diameter is to be calculated and set: $Di_{in\ m} = \sqrt{4 \cdot Fläche_{in\ m^2} / \pi}$	●	●	●	●	**pipe diameter max 1 m = '1' 10 m = '2' (2)** **pipe diameter Di = 1000 mm** + on request ● Standard ○ Option
Measurement crosssection Possibility to input the measurement cross-section, e. g. in m^2 or side lengths of rectangular measurement cross-sections.	●	+	+	+	**surface circle = '1' div. = '2' rectangle = '3'**
Linearizing of characteristic corresponding to calibration code KKZ. The KKZ is individually determined for each Vortex flow sensor. It allows for interchangeability of sensors and guarantees optimal measurement exactitude. See also "Two-digit inputs". The KKZ can be found on all sensors VA, usually at the connecting cable or type plate	●	●	●	●	**Calibration Code Code = 87D4A767 (XX)**
Conversational language english, german, french	●	●	●	●	
Selection of conversational language: D = german, EN = english, F = french	●	+	+	+	**Language: D = 1 EN = 2 F = 3 (1)**
Others: I = italian NL =dutch, E = spanish	+	+	+	+	
Quantity measurement / Actual quantity measurement The integral actual volume flow $\dot{V}$ with respect to time amounts to the actual volume V.					The quantity V is displayed in addition to measured value V/t. Quantity diplay V max. 12 digits + display of measuring unit.
V remains memorized after turning OFF/ON (non-volatile memorized). Measuring unit is **cbm**, when V/t is	○	+	+	○	**V = 000004386491 cbm V/t = 17,45 cbm/h**

displayed in **cbm/h.**					
Longterm measurement	1V	2V	xV	NV	
for display of average velocity from 1 s ... 9999 s. Measuring time in multiples of 1 s adjustable; also for multi-channel instruments one setting is effective for all measuring channels.	○	+	+	○	**long-term period LM = 0060 sec**
Time constant The time constant which is set for the measured value display is also effective for the instantaneous values at analog output and RS 232 output.					**time constant SM = 30 sec**
The time constant can be set on the processing cycle raster in multiples from 1...20 respectively 1...99 s.	●	+	+	+	● Standard + on request ○ Option
Digital Limit v Required Hardware: Relay output					**Digital limit DL v = 15,00 m/s**
Settings Velocity digital limit v_{DL}, hysteresis v_H as well as switching delay. Digital limit settings only in velocity values. Hysteresis = difference between v_{H+} and v_{H-}. $(v_{H+} - v_{DL}) = (v_{DL} - v_{H-})$. Switching delay settable in multiples of 1 s or in multiples of the processing cycle raster respectively.					**hysteresis DL v = 00,50 m/s**
Control by comparing measured value of velocity and the digital limit setting taking the set value of hysterisis and switching delay into consideration. Control in processing cycle.					
Message at relay output falling short of / exceeding digital limit	○	+	+	○	**delay time DL t = 0005 sec**
Password Input or alteration of parameters is only possible by previous input of a personal password (security code). However, the parameter poll is an exception to this limitation.	○	+	+	○	**security code = xxxx**

Data logger Required Hardware: always clock + 8 Kbytes RAM, additional alternative RS 232-/V24-output. Required Software: long-term measurement. Memorizing measurement values (data logger) for 500-750 data records.	○			+	**DLOG: ON = 1 Mode = 2** **clr = 3 pb = 4 # = 5 (X)** Automatic logging of measurement values / data records after each expiration of long-term measurement. Manual logging by key operation.

Play-back for printer or PC with RS 232-/V24-input. PC-Software for taking over data logger data in a PC compatible with IBM.

Software VA 7/96
for Standard Volume Flow determining instruments VTP-VA, VT-VA und VP-VA

The Software Instructions for these instruments can be found in the instructions for the µP-Vortex instruments under NV. NV = Standard Volume Flow determination with Vortex flow sensors.

	1V	2V	xV	NV	
Pressure and temperature are considered as **measurement value or input value** (variable constants) from the translation to standard volume flow / standard velocity.					**Meas. actual pressure = '1' Input = '2' (1)**
				●	**Meas. actual temp. = '1' Input = '2' (1)**
In the case of **VP**-instruments the flow velocity and absolute pressure are considered as measurement values and the temperature only as an input value.				●	
In the case of **VT**-instruments the flow velocity and temperature are considered as measurement values, the absolute pressure however, only as input value.				●	
Linearization of the measurement signal for temperature sensors PT100 in 4 wire configuration				●	
Measured value display Instantaneous value every two seconds. Display selectable:					**NV/t.= 1320 Ncbm/h T = +069,4 °C P= 1130 hPa**
standard volume flow **NV/t**					
actual volume flow **V/t**					
standard flow velocity **Nv**					
actual flow velocity **v**					
temperature **t**					
pressure **p**				●	
mass flow **m/t**				○	
Display units					
Ncbm/h cbm/h hPa					
Nm/s m/s °C				●	
kg/h				○	
selectable				●	
Analog Output (s)					
Flow					**Anal. output proport. v = '1' Norm-v = '2' (2)**
Required Hardware: analog output for flow.					
Output value actual flow velocity v or standard flow velocity Nv, selectable.					
Nv = standardized NV̇ on the measuring area.					
Output signal:					
scalable, configurable, expandable				●	● Standard ○ Option
				+	+ on request

	1V	2V	xV	NV	
Temperature Required Hardware: analog output temperature t for temperatures from -50 °C...+250 °C.					**anal. output I = 20 mA T = +100 °C**
					anal. output I = 20 mA T = +180 °C
Output signal: scalable, configurable, expandable				●	
Pressure Required Hardware: analog output pressure.					**anal. output I = 4 mA Pabs = 1000 hPa**
Output signal: scalable, configurable, expandable				●	**anal. output I = 20 mA Pabs = 3000 hPa**
RS 232 C-/ V24-output Required Hardware: RS-232- / V24-output					
Software for transfer of measured values **NV/t**. If the **standard volume flow** is transmitted, then each transmission value consists of 9 ASCII characters: 1 sign (+, - or blank) 8 characters (digits, blanks and decimal point).				●	
Instead of NV/t (= resulting value) the measurement values and or input values **v**, **p** and **t** (= input values) respectively can also be transmitted: selectable resulting value/ input values.					● Standard ○ Option + on request
If more than one measurable value is transmitted, in this case velocity v together with temperature t and pressure p, then each measured value has in addition 1 ASCII character as code.				+	
Standard quantity measurement Over a period of time the integral standard volume flow NV/t amounts to standard volume NV. NV = standard quantity. NV remains memorized after operating OFF/ON (non-volatile memorized).					The quantity NV is displayed in addition to measured value. Quantity display NV max. 12 digits + display of measuring unit.
					NV = 000004386491 Ncbm NV/t = 25,76 Ncbm/h
Measuring unit Ncbm: Standard-cbm on NV/t display in Ncbm/h.				○	
Long-term measurement for display of averages from 1 s ... 9999 s. Measuring time in multiples of 1 s adjustable for $N\dot{V}$, $\dot{V}$, Nv und v.					**Long-term period LM = 0060 sec**
				○	
Standard volume flow 'dry' for temperatures 0 ... +100 °C.					**Processing cycle NV/t = '1' TV/t = '2' (2)**
				○	