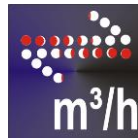


Operating Instructions

Software UCOM



**for configuring Höntzsch transducers
UFA, UVA, UTA, U10, U10a, U10M, U12-Ex and U15-Ex**

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Preface

The UCOM software is designed for configuring Höntzsch transducers for FA, VA and TA flow sensors and for recording data.

The values displayed can be stored as LOG files (ASCII files) for any length of time. Stored data can be read-in at any time using the import function in a spreadsheet or a database. Stored data can be edited using the text editor.

Transducers with serial interface RS232 are connected using the programming adapter or the RS232 data cable either directly to a serial COM port on the PC or via a USB RS232 converter with a USB connection. Drivers must be installed if using a USB RS232 converter. First insert the CD provided with the converter and then plug the cable into the USB port on the PC. Installation follows in two stages, "Recognition of new hardware" twice, see also the instructions in the subfolder "USB_Serial_Converter" on the CD-ROM.

Transducers with HART interface are connected directly to a serial port on the PC using the HART protocol modem with serial interface RS232. If a HART protocol modem with USB interface is being used, this is connected to a USB port on the PC, in which case, the drivers must be installed. First insert the HART protocol modem CD provided and then plug-in the USB cable of the modem. Installation follows in two stages, "Recognition of new hardware" twice, see also the instructions on the HART modem CD-ROM.

1 First Steps

- 1 Before configuration can begin ensure that PC and transducer are connected using the RS232 data cable or programming adapter, or, when using a HART protocol modem, this is to be connected to the closed 4-20 mA load circuit with a total working resistance of between 250 and 500 Ohm. The transducer is powered either by the mains adapter supplied with the programming adapter, or, when using RS232 data cable or HART interface, on the supply voltage terminals (pay attention to type plate: 24 VDC or 230 VAC).
Programming follows via the RS232 or HART interface.
A USB to RS232 converter or a HART protocol USB modem is necessary when using the USB interface.
USB units must be assigned to a COM port number in the system software. The largest COM port number available is 16.
- 2 Start UCOM programme.
- 3 To connect transducers see menu "connect automatically" or "connect manually".
- 4 To read data from the transducer see menu "read data".
- 5 Data in the left input fields can now be modified.
Using the "save==>>" button the value in the left of the "input field" is saved in the transducer processing unit and then displayed on the right in "stored values". A help text appears if the cursor remains on an input field for longer than a few seconds.
- 6 If new parameter values have been saved to the transducer the "CCS" = Clear Check Sum must be administrated either by closing the UCOM programme, by pressing the "CCS" button or "File - Exit" or menu "disconnect", before disconnecting the data cable and the power supply from the transducer. (See under "Function Buttons"). In this way, a new parameter check sum is saved in the transducer, without which the analog output sends an error message (not relevant for Höntzsch thermal transducers type U10a, U10M, U12-Ex and U15-Ex).

2 Menu

File - show frequency

Shows or hides an additional text field for displaying the sensor frequency.

File - open

Opens stored LOG files in a text editor.

File - print

This menu item enables the parameters saved in the unit to be printed as well as a measuring point identifier by creating the parameter in text form. The files are saved in the sub-folder "protocols".

File - exit

Shuts down the connection to the transducer and exits the programme.

The "CCS" = "save new parameter check sum" function is carried out and must be confirmed with "ok" (see "Function Buttons" below).

Connect (automatic or manual)

The menu function "connect automatically" scans the available COM ports automatically (this takes a few seconds) and displays the available Höntzsch transducers in a window for selection of interface. Once the selection has been made a connection via the chosen COM port is made using the "Resume" button.

(Note: scanning the COM ports can take more than 30 seconds if multiple interface cards with COM ports are installed in the data processor).

Should "connect automatically" result in a conflict between equipment because the COM ports are scanned automatically, the menu item "connect manually" can be used to manually select the COM port and be re-connected with "Resume".

An active connection is displayed in the status line. The above settings must be checked should a connection error arise.

Disconnect

Disconnects the transducer.

The "CCS" = "save new parameter check sum" function is carried out and confirmed with "ok". (See "Function Buttons" below).

Read data

Reads all stored parameters and displays them on the main form.

Parameter reading values 'X' in red field are not available.

3 Display Fields

Parameter set list no.

Displays the number of the used parameter set list.

Serial number

Displays the serial number of the transducer. Transducer type and software version appear in the centre of the status line.

4 Input Fields

Numerical values can be entered or selected using the input fields on the left of the parameter pages. By pressing the "Save=>>" button the value on the left in the "input field" is saved to the transducer processing unit and is then displayed on the right in the field "stored values".

Process value

(Bottom left above status line) click on a parameter in an alphabetical parameter list to jump directly to the "input field" of the parameter.

Terminal value – analog output

4 ... 20 mA / 0 ... 10 V = 0 ... x m/s

Terminal value x is configurable. Output variable at analog output is the average flow velocity proportional to the volume flow.

If the average flow velocity is not known, it can be calculated from volume flow and pipe inside diameter using the integrated calculator (see button to the left of input field).

V = flow rate, F = measuring surface and v_m = average flow velocity

The formula for flow rate V is

$$V = F * v_m.$$

Using the formula

$$PF = v_m / v_p$$

for the profile factor PF results in

$$V = F * PF * v_p$$

for the flow rate.

In this connection v_p is the local flow velocity. This is the velocity close to the sensor element (vane wheel with FA sensors or bluff body with VA sensors).

Sensor measuring range data is equivalent to the local flow velocity v_p .

Example:

Measuring flow velocity with a probe in a tube of $D_i = 80$ mm. Probe measuring range v_p : 0.5 ... 40 m/s

Desired analog output setting: 0 ... 400 m³/h = 4 ... 20 mA.

Note: necessary analog output scale must be in "m/s".

Taking the measuring range of the probe and the relevant PF (as per Technical Data Sheet or Sensor Data Sheet) for a measuring tube with internal diameter $D_i = 80$ mm ($PF = 0.807$), a measurable flow rate of 7.3 m³/h ... 584.1 m³/h is determined.

Using $v = V / F$ and $V = 400 / (0.080^2 * \pi / 4 * 3600)$ m³/h results in the equivalent average flow velocity $v_m = 22.10$ m/s for a flow rate of 400 m³/h.

The terminal value of the analog output is also to be set at $v_m = 22.10$ m/s (equivalent to a flow rate of 400 m³/h). Set value 0.807 as profile factor.

Note:

- If the measuring surface does not have a circular cross-section, e.g. a rectangular cross-section, then from the rectangular surface the diameter of a circular surface with the same dimensions must be calculated. The diameter calculated in this way can be used to find the associated profile factor in the Technical Data Sheet or Sensor Data Sheet (see also input value tube inside diameter).
- As a general rule the profile factor for measuring tubes FA Di ... , VA Di ... or TA Di ... is 1.000 (to be sure, consult the relevant Technical Data Sheet).
- The transducer profile factor setting does not affect the scaling of the analog output. Reason: the terminal value of the analog output is firmly assigned to the average flow velocity – determined by profile factor.
- If the digital output is selected as directional output in the case of directional-sensing vane wheel flow sensors, then the analog output displays the amount of the flow velocity. In the case of positive direction of flow the digital output is inactive (open-collector-transistor or relay off); with negative direction of flow the digital output is active (open-collector-transistor or relay on). If the digital output is not selected as directional output, then the analog output displays the flow velocity with a sign, i.e. the zero point lies in the middle of the analog output range (at 12 mA or 5V) (see also switching impulse / limit value / directional FA)

Profile factor PF

When measuring with FA, VA or TA probes in circular pipelines, a profile factor must be used to reevaluate the local velocity v_p to the average velocity v_p . The profile factors determined by Höntzsch for fully developed turbulent flow dependent on probe type and inside diameter of measuring tube can also be found in the relevant documentation which can be referred to for transducer setting (see also "Terminal value – analog output").

Tube inside diameter

Enter the inside diameter in mm to calculate the quantity for pulse output or with optional LCD to display flow rate and quantity.

Example:

The nominal size for the tube inside diameter is 40 mm. Real measurement 40.7 mm.
Required transducer setting: 00407

Note:

If the measuring surface does not have a circular cross-section, e.g. a rectangular cross-section, then the diameter of a circular surface with the same dimensions must be calculated from the rectangular surface.

Physical units

The following physical units are available for thermal sensors TA as U10M:

00000 = l/s	standard litre per second
00001 = l/min	standard litre per minute
00002 = l/h	standard litre per hour
00003 = Nm ³ /s	standard cubic metre per second
00004 = Nm ³ /min	standard cubic metre per minute
00005 = Nm ³ /h	standard cubic metre per hour
00006 = kg/h	kilogramme per hour

Bus address

Enter bus address for TA sensors as U10M in the range of 0 - 255 (also adjustable via M-Bus).

Baud rate

The following baud rates are available for thermal sensors TA as U10M (also adjustable via M-Bus):

00000 =	300	300 Baud
00001 =	600	600 Baud
00002 =	1200	1200 Baud
00003 =	2400	2400 Baud
00004 =	4800	4800 Baud
00005 =	9600	9600 Baud
00006 =	19200	19200 Baud
00007 =	38400	38400 Baud

Time constant/damping

The entry will be referred to as either time constant or damping, depending on which unit is connected.

Damping (with U10M electronics):

The damping acting on the analog output values can be set in a range of values from 1 ... 99.

Time constant (with other electronics):

The time constant acting on the analog output values can be set in a range of 1 ... 99 seconds. In the case of thermal sensors with U10a electronics entry is only effective in the range 1 ... 20 seconds (higher values are interpreted as 20 seconds).

Higher time or dumping constants with wild fluctuations result in a smoothing of the output signal.

Sensor type

Enter type of flow sensor

- For vane wheel flow sensors FA:
(type apparent from serial no., e.g. "mn20")

00000 =	mc FA	
00001 =	mn FA	
00002 =	md FA	
00003 =	mx FA	
00004 =	FA pairs of values	(see also parameter sheet 'pairs of values')
- For vortex flow sensors VA:

00005 =	VA-KKZ	(see also parameter 'calibration no. VA')
00006 =	VA pairs of values	(see also parameter sheet 'pairs of values')

Measuring range FA

Enter measuring range for vane wheel flow sensors FA

(measuring range apparent from serial no., e.g. "mn20")

(not relevant for type selection FA pairs of values, VA KKZ or VA pairs of values)

Available are:

00000 =	03	3 m/s for air/gases	
00000 =	20	20 m/s for air/gases	7.5 (3 for md) m/s for water/liquids
00001 =	40	40 m/s for air/gases	10 m/s for water/liquids
00002 =	80	80 m/s for air/gases	10 m/s for water/liquids
00003 =	120	120 m/s for air/gases	10 m/s for water/liquids

Medium FA

Enter medium for vane wheel flow sensors FA

(not relevant for type selection FA pairs of values, VA KKZ or VA pairs of values)

Available are:

00000 = G	medium air/gases
00001 = F	medium water/liquids

Directional sensing FA

Enter sensing of direction of flow for directional vane wheel sensors FA

(apparent from "R" in serial no., e.g. "mn20R")

Available are:

00000 = without	for vane wheel sensors without directional sensing
00001 = with	for vane wheel sensors with directional sensing

Sensor monitoring

Enabling and disabling the sensor monitoring (only relevant for UVA or UFA in LDG16 housing).

Sensor monitoring must be disabled when connecting an Ex-isolation/supply unit in series, e.g. LDX2 before UVA or UFA transducer in LDG16 housing).

Available are:

00000 = DISABLE	(with Ex-isolation/supply unit)
00001 = ENABLE	(without Ex-isolation/supply unit)

Calibration number (KKZ) VA or TA

(Only relevant for type selection 00005 = VA KKZ or thermal sensors TA – with the exception of U10M electronics).

Calibration number is determined individually for vortex flow sensors VA and thermal flow sensors TA. The KKZ allows for interchangeability of certain designs of flow sensors and can be found in the relevant Technical Data Sheet. In the case of sensors with pairs of values linearization of characteristics, changing the KKZ does not change the output of the measured value.

Switching pulse / limit value / FAR

Input for the effect of the digital output as pulse output for quantity counting, as limit value for the velocity v in m/s or as directional output for vane wheel flow sensors FAR.

Available are:

00000 = pulse output for quantity	for quantity counting
00001 = limit value v	for velocity v in m/s
00002 = directional output FA	for directional sensing vane wheel flow sensors

Note:

If the digital output is selected as directional output for FAR sensors, then the analog output displays the amount of the flow velocity.

In the case of positive direction of flow the digital output is inactive (Open-Collector-Transistor or relay off); with negative direction of flow the digital output is active (Open-Collector-Transistor or relay on).

If the digital output is not selected as directional output, then the analog output displays the flow velocity with a sign, i.e. the zero point lies in the middle of the analog output range (at 12 mA or 5V).

(See also Terminal value - analog output).

Limit value v

(Only relevant if switching pulse / limit value / FAR selection 00001 = limit value for velocity).

Enter a limit value in m/s (positive limit value only in the case of directional sensing). If the velocity for the limit value is not known, it can be calculated from flow rate and pipe inside diameter using the integrated calculator (see Menu "Calculate").

If the measured value is less than the limit value, the digital output is inactive (Open-Collector-Transistor or relay off); if the measured value is greater than the limit value, the digital output is active (Open-Collector-Transistor or relay on).

Switching pulse m³ (cbm) / l (litre)

(Only relevant if switching pulse / limit value / FAR selection 00000 = pulse output quantity counting or option LCD)

Select whether quantity pulses of the pulse output should be displayed in m³ (cbm) or in l (litre). Display in l (litre) only permissible with measuring tube diameter of max. 200 mm.

Available are:

- 00000 = pulses in m³ (cbm)
- 00001 = pulses in l (litre) (permissible with measuring tube diameter of max. 200 mm)

m³ (cbm) / l (litre) per pulse

(Only relevant if switching pulse / limit value / ... selection 00000=pulse output quantity counting or optional LCD)

The maximum pulse repetition frequency is 1 Hz = 1 pulse per second = 3600 pulses per hour.

Reasonable values for m³ (cbm) per pulse are:

- 1 m³ per pulse = 00001 for flow rates up to 3600 m³/h
- 10 m³ per pulse = 00010 for flow rates up to 36000 m³/h
- 100 m³ per pulse = 00100 for flow rates up to 360000 m³/h
- 1000 m³ per pulse = 01000 for flow rates up to 3600000 m³/h

Reasonable values for l (litre) per pulse:

- 1 l per pulse = 00001 for flow rates up to 3600 l/h
- 10 l per pulse = 00010 for flow rates up to 36000 l/h
- 100 l per pulse = 00100 for flow rates up to 360000 l/h
- 1000 l per pulse = 01000 for flow rates up to 3600000 l/h

depending on diameter and terminal velocity.

Example:

Recording consumption with an external pulse counter.

With a constant flow rate of 400 m³/h, the counter delivers 400 pulses with a setting of 00001 per hour, i.e. one pulse every 9 seconds.

With a constant flow rate of 400 m³/h and a setting of 00002, the transducer would deliver 1 pulse per 2 m³, i.e. only 200 pulses per hour.

Pulse configuration + / -

(Only relevant if switching pulse / limit value selection 00000=pulse output quantity counting and directional sensing FA selection 00001=with directional sensing)

Allocation of pulse output to quantity counting to positive or negative quantity pulses.

Available are:

- 00000 = + pulses
- 00001 = - pulses

Decimal places quantity display

(Only relevant with optional LCD and switching pulse m³ (cbm) / l (litre) selection 00001=pulse in litre)

Quantity display is always in m³ (cbm). If the allocation of the quantity pulse is in litres, the decimal places of the quantity display can be defined:

Available are:

- 00000 =0 decimal places
- 00001 =1 decimal places
- 00002 =2 decimal places
- 00003 =3 decimal places

Reasonable values for the decimal places are:

- from 1 l ... 9 l per pulse = 00003 3 decimal places
- from 10 l ... 99 l per pulse = 00002 2 decimal places
- from 100 l ... 999 l per pulse = 00001 1 decimal place
- from 1000 l + per pulse = 00000 0 decimal places

Switching v / Nv

(Only relevant for transducers UVA and UFA):

Switching between actual velocity v and standard velocity Nv at analog output and with optional LCD.

Available are:

00000 = 0 v (actual velocity)

00001 = 1 Nv (standard velocity)

To calculate the standard velocity from the actual velocity, the parameters actual pressure, standard pressure and standard temperature are used according to the following formula:

$$N\text{-velocity } N_v = B\text{-velocity } v * (N\text{-temperature} * B\text{-pressure}) / (B\text{-temperature} * N\text{-pressure})$$

Absolute pressure in hPa, temperature in K (Kelvin)

Note

When selecting 00001 = 1 Nv (standard velocity) the parameters 'terminal value analog output' and 'limit value' in standard velocity and the 'quantity pulse' in standard volume are evaluated.

Actual pressure (absolute)

(Only relevant for transducers UVA and UFA, when switching v / Nv selection 00001 = Nv):

Input in hPa.

Actual temperature

(Only relevant for transducers UVA and UFA, when switching v / Nv selection 00001 = Nv):

Input in K (Kelvin).

A calculator is available for converting °C into K (Kelvin), (button to the left of the input field for the standard temperature). The value can then be transferred using the "Resume" button.

Standard pressure (absolute)

(Only relevant for transducers UVA and UFA, when switching v / Nv selection 00001 = Nv):

Input in hPa.

Standard temperature

(Only relevant for transducers UVA and UFA when switching v / Nv selection 00001 = Nv):

Input in K (Kelvin).

A calculator is available for converting °C into K (Kelvin), (button to the left of the input field for the standard temperature). The value can then be transferred using the "Resume" button.

5 Pairs of values

To determine the connection between output frequency and flow velocity, up to 30 pairs of values can be logged for volumetric calibration of vane wheel measuring tubes FA Di ... and vortex measuring tubes VA Di ...

Setting for flow sensor type selection 00004 = FA pairs of values for measuring tubes FA Di ... or 00006 = VA pairs of values for measuring tubes VA Di ...

Number of pairs of values

Indicates the number of pairs of values stored. With the U10M 00 ... 30 or 00 ... 60 pairs of values can be selected.

Pair of values

Index field for selection of pair of values number xx (01 up to number of pairs) of the pair shown below it.

Velocity

Pair of values xx velocity value xx

h-value

Pair of values xx h-value xx (frequency value xx)

Button "Print pairs of values" saves a list of all stored pairs of values. The list is displayed on the screen with text editor and can be printed using the text editor print function or saved as File.

6 Function Buttons

Function Button "CCS"

Bottom right above the status line: CCS = Clear Check Sum

This function sets a new check sum for checking the parameter storage.

If a parameter has been changed then a "CCS" must be sent to avoid error display signal at analog output.

The "CCS" function follows automatically when quitting UCOM and after "Disconnect".

Note:

After modifying parameters always shut down the UCOM programme first of all or apply "Disconnect" before disconnecting the transducer from the power supply and the data connection, thus ensuring that a new parameter check sum is stored.

Function Button "CVM"

Bottom right above the status line: CVM = Clear quantity counter

This function resets the quantity counter to zero via optional LCD display or M-Bus.

7 Measured Values

The current measured value is displayed in the top half of the main form. Switching between m/s, m³/h and l/min is possible.

Record

The UCOM software has the facility to store measured data at fixed intervals using the "Record" button. Values between 1 ... 60 seconds can be entered here. Data is then stored depending on the time interval setting, approx. every 1 ... 60 s. Press the "Stop" button to complete recording. Stored values – data record number, value with prefix and unit, frequency (optional), date, time - can be viewed using the "File" button.

Processing the records

All files are saved in ASCII format and can be opened using the text editors. Records can be processed at any time using the import function of a database or spreadsheet.

Note:

During measurement, (time interval not 0), no parameters can be read or stored. For release of reading or storing parameters: set time interval to 0.

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