höntzsch
flow measuring technology

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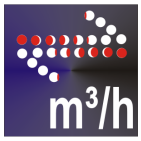
Operating Instructions

Software UCOM



for adjusting Hoentzsch transducers
UFA, UVA, UTA, U10, U10a, U12-Ex and U15-Ex

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Preface

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

The values displayed can be stored as LOG files (ASCII files) for any length of time in the subfolder "Logs". 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 cable with a USB connection. Drivers must be installed if using a USB RS232 converter cable. First insert the CD provided and then plug the USB RS232 converter cable in to the USB port on the PC. Installation follows in two stages, 'Recognition of new hardware' twice, see also the instructions in the programme folder 'UCOMe' in the subfolder 'USB RS232 Converter Cable'.

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

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, it 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 a 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 (see instructions above).

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.
A selection window can be opened when an input field has an opening arrow.
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 in the transducer, before disconnecting the data cable and the power supply from the transducer the "CCS" = Clear Check Sum must be carried out either by closing the UCOM programme or by pressing the "CCS" button or "File – Exit" or menu "disconnect" (see under "Function Buttons"). In this way a new parameter check sum is saved in the transducer, without which the analog ouput signals an error message (not relevant for Hoentzsch thermal transducers type U10a, U12-Ex and U15-Ex).

2. Menu

File - Open
Opens stored LOG files. The files are saved in the sub-folder "Logs".

File - Print
Prints the stored parameters and a measuring point identifier. 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 confirmed with "ok" (see under "Function Buttons").

Connect (automatic or manual)
The menu function "connect automatically" scans the available COM ports automatically (takes a few seconds) and displays the available Hoentzsch 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: If multiple interface cards with COM ports are installed in the data processor, scanning the COM ports can take more than 30 seconds).
Should "connect automatically" result in a conflict between equipment because the COM ports are automatically scanned, the menu item "connect manually" can be used to manually select the COM port and reconnected with "Resume".
An active connection is displayed in the status line. In case of a connection error the above settings must be checked.

Disconnect

Disconnects the transducer.
The "CCS" = "save new parameter check sum" function is carried out and confirmed with "ok" (see under "Function Buttons").

Read data

Reads all stored parameters and displays them on the main form.
Parameter reading values 'X' in red field are not available.

Calculate

Calls up an integrated data processor to convert the units flow rate (m³/h, l/min or l/h) to flow velocity (m/s).

The parameter terminal value analog output and limit value must be entered as flow velocity values. If, from the application, only flow rate values and not flow velocity values are known, then these must first of all be converted into flow velocity values for configuration of the terminal value analog output and limit value. This can be done using the integrated data processor.

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 in 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 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 data processor (see Menu "Calculate").

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 Di = 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 profile factor PF (as per Technical Data Sheet or Sensor Data Sheet) for a measuring tube with internal diameter Di = 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 / (0.080²*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 PF in the Technical Data Sheet or Sensor Data Sheet (see also input value tube inside diameter).

Note:
As a general rule the profile factor for measuring tubes FA Di ... , VA Di ... or TA Di ... is 1.000 (as a precaution, consult the relevant Technical Data Sheet).

Note:
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 using profile factor.

Note:
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 (at12 mA or 5V)
(see also Switching impulse / limit value / direct. FA)

Profile factor PF

When measuring with FA, VA or TA probes in circular pipelines, a profile factor must be used to revaluate the local velocity v_p to the average velocity v_p. The profile factors determined by Hoentzsch 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 consulted for transducer setting (see also "Terminal value – analog output").

Pipe 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: 0040.7

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.

Time constant

The time constant affecting the output values at the analog output can be set in a range from
1 ... 99 seconds. The time constant of thermal sensors type U10a and U12-Ex can be set in the range from 1 ... 20 seconds (higher values = 20 seconds).
High time constants with strong fluctuations in the flow velocity 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 variates (see also parameter sheet 'pairs of variates')
For vortex flow sensors VA:
00005=VA-KKZ (see also parameter 'calibration no. VA')
00006=VA pairs of variates (see also parameter sheet 'pairs of variates')

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 variates, VA KKZ or VA pairs of variates)
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	
00003=120	120 m/s for air/gases	

Medium FA

Enter medium for vane wheel flow sensors FA
(not relevant for type selection FA pairs of variates, VA KKZ or VA pairs of variates)
Available:

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")
(for type selection VA KKZ or VA pairs of variates 00000=without selecting)
Available:
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)
(when connecting an Ex-isolation/supply unit in series e.g. LDX2 before a UVA or UFA transducer in LDG16 housing the sensor monitoring must be disabled)
Available:
00000=DISABLE (with Ex-isolation/supply unit)
00001=ENABLE (without Ex-isolation/supply unit)

Calibration number VA (KKZ) or TA (KKZ)

(only relevant for type selection 00005=VA KKZ or thermal sensor TA)

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

Switching pulse / limit value / FAR

Entry for the impact 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 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 (at12 mA or 5V)

(see also Terminal value - analog output)

Limit value v

(only relevant if switching pulse / limit value selection 00001=limit value for velocity)
Enters 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 data processor (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 if 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 selection 00000=pulse output quantity counting or option LCD)
Selection 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:

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)

Max. 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:
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 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 places
from 1000 l + per pulse = 00000 0 decimal places

Switching v / Nv

(only relevant for Hoentzsch transducers type 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)
Calculate the standard velocity from the actual velocity the following parameter actual pressure, standard pressure and standard temperature using the following formula:

N-velocity Nv = B-velocity v * (N-temperature * B-pressure) / (B-temperature * N-pressure)
Absolute pressure in hPa, temperature in K (Kelvin)

Note
When choosing 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 Hoentzsch transducers type UVA and UFA if switching v / Nv selection 00001= Nv):
Input in hPa.

(only relevant for Hoentzsch thermal transducers type UTA):

Input in hPa. The mean working pressure is required in order to rectify the zero point.

Actual temperature

(only relevant for Hoentzsch transducers type UVA and UFA if switching v / Nv selection 00001= Nv):
Input in K (Kelvin).
Click on the unit K with the right mouse button to activate a window to convert °C to K (Kelvin); the value can be transferred to the input field using the "Transfer" button.

Standard pressure (absolute)

(only relevant for Hoentzsch transducers type UVA and UFA if switching v / Nv selection 00001= Nv):
Input in hPa.

Standard temperature

(only relevant for Hoentzsch transducers type UVA and UFA if switching v / Nv selection 00001= Nv):
Input in K (Kelvin).
Click on the unit K with the right mouse key to activate a window to convert °C to K (Kelvin); the value can be transferred to the input field using the "Transfer" button.

5. Pairs of variates

To determine the connection between output frequency and flow velocity, up to 30 pairs of variates 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 variates for measuring tubes FA Di ... or 00006=VA pairs of variates for measuring tubes VA Di...

Number of pairs of variates

Specifies the number of stored pairs of variates. Select 02 ... 30 pairs of variates.

Pair of variates

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

Velocity

Pair of variates xx velocity value xx

h-value

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

Button "Print pairs of variates" prints a list of all stored pairs of variates. List displayed on 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.
Must be carried out when a parameter has been changed to avoid error signal at analog output and must be confirmed with "ok" (not relevant for Hoentzsch thermal transducers type U10a, U12-Ex and U15-Ex).
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 has been stored.

Function Button "CVM"

Bottom right above the status line: CVM = Clear quantity counter
This function resets the quantity counter displayed in an optional LCD.

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 2 ... 60 seconds can be entered here. Data is then stored depending on the time interval setting, approx. every 2 ... 60 s. Press the "Stop" button to complete recording.
Stored values – data record number, measured value, unit, date, time - can be viewed using the "File" button.

Processing the records

The files are saved in the sub-folder "Logs".
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:
While a measurement runs, (time interval not 0), no parameters can be read or stored. For release of reading and storing of parameters: set time interval to 0.