



zertifiziert nach
ISO 9001 : 2000
certified quality

Annex

Operating Instructions

Transducer UVA integrated in the connection housing AS102 of the vortex probes VA40, VAT40 and vortex measuring tubes VA Di

Contents

- A1 Scope of Delivery**
 - A1.1 Description, Type Plates
- A2 Technical Specifications**
 - A2.1 Operating Conditions
 - A2.2 Housing and Connectors
 - A2.3 Electrical Data
 - A2.4 Measurement Uncertainty
- A3 Installation**
 - A3.1 Block Diagram
 - A3.2 Wiring Diagrams
 - A3.2.1 Shielding contact at cable bush
 - A3.2.2 Power supply
 - A3.2.3 Analog output v (Flow)
 - A3.2.4 Relay
 - A3.2.5 Interface RS232
 - A3.2.6 Optional LCD display
 - A3.2.7 Optional analog output t (Temp)
- A4 Functional Description**
- A5 Settings**
- A6 Initial Operation**
- A7 Operation**
- A8 Shut-down, Dismantling**
- A9 Inspection**
- A10 Troubleshooting**
- A11 Replacement Parts**



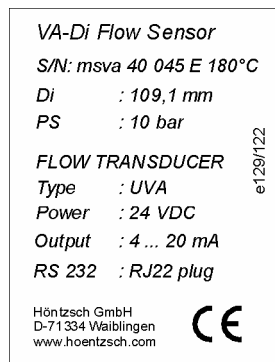
A1 Scope of Delivery

- Transducer UVA integrated in the connection housing of the vortex sensor VA
- Operating Instructions U326;
data sheet vortex flow sensor with integrated transducer UVA
- CD-ROM with PC configuration software UCOM (optional)
- Interface cable RS232 for PC connection COM interface (optional)
- USB adapter in addition to interface cable RS232 (optional)

Please check that everything listed in the Delivery Note / Technical Data Sheet is included in the delivery.

A1.1 Description, Type Plates

Remove cover to reveal type plate:



VA-Di Flow Sensor	: measuring tube VA Di
VAT-Di Flow Sensor	: measuring tube VA Di with temperature measurement
VA40 Flow Sensor	: probe VA40
VAT40 Flow Sensor	: probe VA40 with integrated temperature measurement
S/N	: serial no.
Di	: inside diameter Di of measuring tube (VA Di and VAT Di only)
PS	: max. permissible pressure (absolute)
FLOW TRANSDUCER	: integrated transducer
Type	: UVA (transducer for vortex sensors VA)
Power	: supply voltage 24 VDC = 24 V direct voltage 12 VDC = 12 V direct voltage
Output	: 4-20 mA = current output 4-20 mA 0-10 V = voltage output 0-10V
RS232	: RJ22 plug



A2 Technical Specifications



A2.1 Operating Conditions

ambient air temperature	
of connection housing	
in use	: -25 ... +50 °C
with optional LCD display	: 0 ... +50 °C
protection class	: IP65
mounting attitude	: no restrictions

A2.2 Housing and Connectors

protection	: housing IP65
material	: aluminium
external dimensions	: L/W/H = 150/100/80 mm
bush	: metallic screwed cable glands for cable diameter 5 ... 10 mm with contacting of the shielding
connections	: 'Push-in' circuit board terminals for wires with cross-section 0.14 ... 1.5 mm ² . No tools necessary for strand connection, simply insert the strand ends (twisted or with end sleeve) into the terminal. Separate strands by applying pressure to the terminal release spring with a pen or screwdriver.

A2.3 Electrical Data

Supply voltage, mains supply:

24 V DC (20 ... 27 V DC), power < 5 W
12 V DC (10 ... 17 V DC), power < 5 W

The mains supply is electrically isolated from the UVA outputs.

UVA analog output v	: 4 ... 20 mA = 0 ... x m/s (or m ³ /h), terminal value x configurable / burden max. 400 Ohm, alternative: 0 ... 10 V = 0 ... x m/s (bzw. m ³ /h), terminal value x configurable / impedance 1 kOhm
----------------------------	---

Relay	: (potential-free normally open contact), max. 300 mA / 27 V DC, configurable as limit value v or quantity pulse (see Functional Description)
--------------	---

RS232 interface	: for connection with PC programme UCOM (see Functional Description) 9600 Baud, 8Bit, no parity, 2 stop bits, Xon/Xoff
------------------------	--



**Connection
for optional LCD display**

: flat ribbon cable with 10-pin connector
Do not plug in or out when live!
Risk to persons and equipment!

optional analog output t

: 4 ... 20 mA = x ... y °C
burden max. 200 Ohm
x °C fixed preset initial value for measuring temperature
y °C fixed preset terminal value for measuring temperature
(see accompanying documentation)

A2.4 Measurement Uncertainty

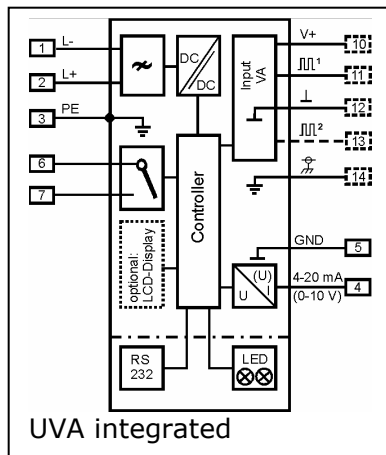
Recording the measurement frequency (at 1000 Hz): <0.1%
Analog output (terminal value): <0.15%
Linearity error: <0.1%
Temperature coefficient: <20 ppm/K
(at 25 °K temperature difference equivalent to <0.05%)



A3 Installation

Authoritative for installation are the valid national regulations for installing electrical equipment, the general engineering regulations and these Operating Instructions.

A3.1 Block Diagram



(Terminals 10 ... 14 are not populated and only accessible internally)



A3.2 Wiring Diagrams

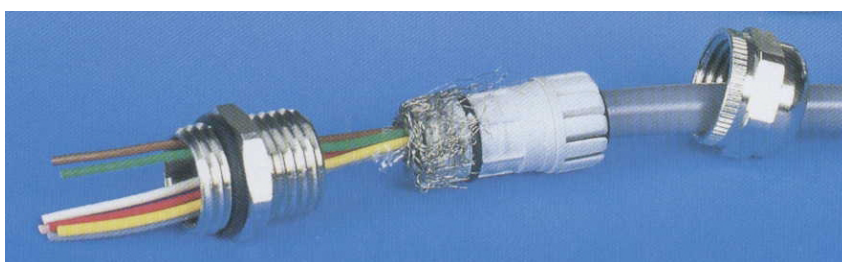
Electrical connection must be carried out according to the appropriate wiring diagram.

Faulty connection can cause damage to persons and destruction of the electronics.

Do not install or wire up the transducer under mains voltage. **Non-compliance can cause damage to persons and destruction of the electronics.**

In this connection and depending on the configuration of the equipment, one of the following wiring diagrams must be taken into account. Wiring diagrams for measuring systems in customer-specific design will be supplied separately.

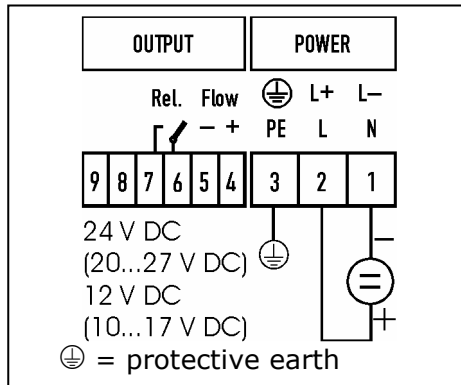
A3.2.1 Shielding contact at cable bush



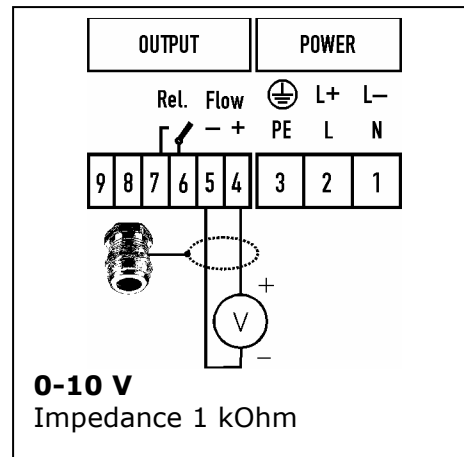
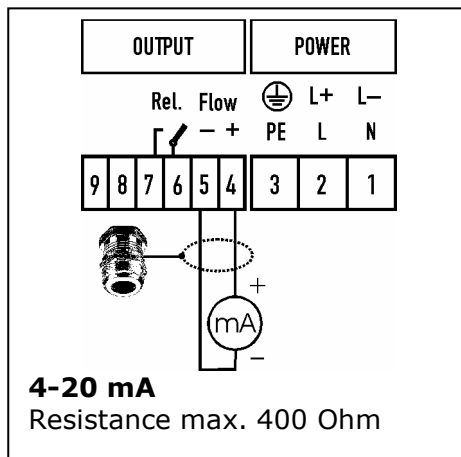


A3.2.2 Power supply

Before connecting please check that the power supply is within the specification. Remove the cover of the integrated UVA to reveal the type plate with the relevant information.



A3.2.3 Analog output v



Remove the cover of the integrated UVA to reveal the type plate with the relevant information regarding analog output.

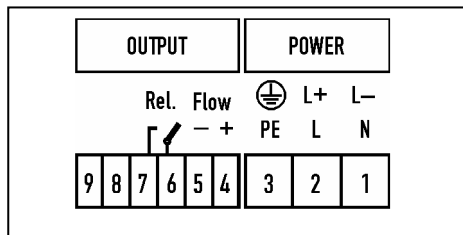
The terminal value of the analog output can be parameterised with the PC software UCOM via the RS232 interface. The customer-specific programmed value can be found in the accompanying documents.



A3.2.4 Relay output

The normally open contact of the relay is shown in rest position (relay coil off).

The function of the relay output and the corresponding setting parameter are parameterable with the PC software UCOM via the RS232 interface. The customer-specific settings are in the parameter printout.



A3.2.5 RS232 Interface



Fig. 1: PC connection with RJ22 plug with open cover

The RS232 interface connection is below left next to the connecting terminals.

The RJ22 plug of the PC connecting cable is plugged in to the socket (see Fig. 1). PC connection follows at a COM port or using an optional USB adapter.



A3.2.6 LCD display in housing cover (optional)

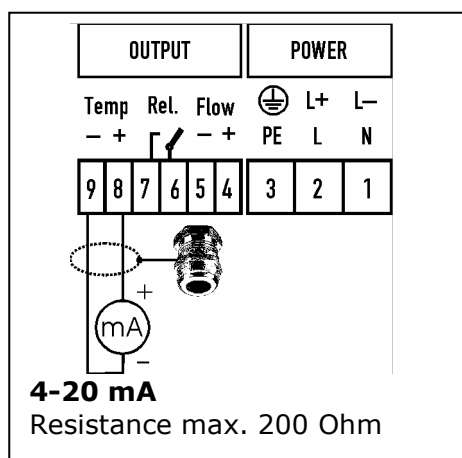


Abb. 2: LCD display connection with cover open

The flat ribbon cable with 10-pin connector should not be plugged in or out when live! Risk to persons and equipment!

Visible are the readout potentiometer for the contrast of the LCD display, the reset button for the quantity counter, the ST1 and ST2 jumpers (see Functional Description A4).

A3.2.7 Analog output t (temp) (optional)



The initial value x °C (4 mA) and the terminal value y °C (20 mA) are permanent hardware settings and recorded in the Technical Data Sheet.



The negative terminal of the analog output t (terminal 9) is on the same potential as the negative terminal of the analog output v (terminal 5).

The analog output signal t is not used in the UVA (e.g. for conversion to standard values).

A4 Functional Description

UVA transducers are designed for connection of vortex probes VA40 and vortex measuring tubes VA Di for measuring flow velocity or flow rate of air/gases.

The signal frequency generated from the flow sensor is converted to a linear **analog output signal 4-20 mA or 0-10 V**. The analog terminal value is parameterisable.

Current output : **4 ... 20 mA** = 0 ... x m/s (or m³/h)

alternatively:

Voltage output : **0 ... 10 V** = 0 ... x m/s (or m³/h)

The actual velocity or actual flow rate can be converted to standard velocity or standard volume flow by entering the parameter 'temperature' and 'pressure'.

A **relay output** (normally open contact) can be parameterised for **1 of 2 functions**:

- as **limit value** for the flow velocity or the flow rate:
flow velocity < or = limit value : relay contact idle
flow velocity > limit value : relay contact in working position
- as **quantity pulse** for quantity measurement:
max. pulse repetition frequency 1 Hz per unit of volume, pulse duration 0.5 s,
e.g. 1 pulse per 1, 10 or 100 m³ or 1, 10 or 100 litre respectively

Self diagnosis according to NAMUR NE43:

No error : yellow LED off
yellow LED on (flow velocity = 0)

or

green LED flashes (flow velocity > 0)

Error : yellow LED on and with:
- analog output 4-20 mA : < 3.6 mA
- analog output 0-10 V : < -0.2 V

Monitoring power supply, data logging, sensor interface, parameter settings (see under A10: Troubleshooting)

PC serial port RS232

used to change calibration data and setting parameters.

Remove cover.

Plug PC connector cable (optional) with RJ22 into the socket in the UVA (see Fig. 1, A3.2.5)

Connect other end of cable to RS232 PC socket.

If a USB connection is required, then an optional USB / RS232 interface converter must be inserted.

Changes to the setting can now take place after starting the PC programme UCOM (optional) (see under A5: Settings).



Optional LCD display in cover:

2 x 16-digit, character height 5.5 mm.

Display line 1 : instantaneous value velocity or flow rate.
Display line 2 : 'quantity counter' or 'error code'.

Configuration (see Fig. 2, A3.2.6) via 2 jumper wrap connectors ST1 and ST2

Display line 1:

ST1 = m/s	and ST2 = any:	velocity in (N)m/s *
ST1 = m ³ /h (lt/h)	and ST2 = A:	flow rate in (N)m ³ /h
ST1 = m ³ /h (lt/h)	and ST2 = B:	flow rate in (N)lt/h **

* standard values (N) only when parameter 'switching v/NV' =1 (see under A5)

** only when diameter Di < 75.0 mm, otherwise display in (N)m³/h

Display line 2:

Quantity counter in m³ with 0 ... 3 decimal places
(see under A5: parameter 'switching pulse m³(cbm) / l (litre)' and
parameter 'm³ (cbm) / l (litre) per pulse' and
parameter 'decimal places quantity display')
with error : error 01 = parameter error
error 02 = sensor error

(see A10: Troubleshooting)

Reset button in cover: see Fig. 2: A3.2.6

Reset the quantity counter by pressing the reset button for more than 3 seconds.

A5 Settings

The following setting parameters can be read using the PC software UCOM and are also alterable. The customer-specific settings are shown on the parameter print-out, which is included in the documents.

Please find operation instructions PC software UCOM in document U385.



A6 Initial Operation

(A3.2.2 Pay attention to power supply)

(A3.2.3 Pay attention to analog output)

After connecting the supply voltage the green LED lights up, the yellow LED is switched off.

No flow at sensor: the green LED is permanently on, the analog output supplies a value of 4 mA at flow output or at voltage output a value of 0 V.

Flow at sensor: the green LED flashes, the analog output supplies an analog value other than the given values of the zero flow conditions (see above).



A7 Operation

(Pay attention to A2.1 Operating Conditions)
(Pay attention to A2.3 Electrical Data)



A8 Shut-down, Dismantling

Before disconnecting the cable please ensure that the supply voltage is switched off.

A9 Inspection

Checking the LEDs, (see under A4 Functional Description, Self diagnosis)



A10 Troubleshooting

Fault	Cause	Troubleshooting
green LED does not light up	no power supply	check connecting cable, measure voltage at connecting terminals
	transducer electronics faulty	return to factory
yellow LED lights up, green LED does not flash despite flow, analog output = error (<3.6 mA or < -0.2V)	cable break or short-circuit	check terminals; check cable for continuity and replace if necessary
	transducer or sensor electronics faulty	return to factory
yellow LED lights up, green LED flashes with flow, analog output = error (<3.6 mA or < -0.2V)	parameter error	check parameter with UCOM software, save new checksum (or return to factory)
	transducer electronics faulty	return to factory
no measured value	sensor contaminated	clean sensor according to instructions
	coefficient set at 0.000	set coefficient at 1.000
measured value too low	sensor contaminated	clean sensor according to instructions
	coefficient setting too low	set coefficient at 1.000
	input/output section too short	change sensor position; improve flow conditions with a flow rectifier
	rotational flow	reposition sensor in flow direction; install flow rectifier
	reduced acoustic coupling in the sensor elements as a result of intense vibration or a powerful impact	return sensor to factory for performance test
	burden at current output is greater than specified in the Technical Data Sheet. This results in correct output values in the lower range and no longer increasing output values at the top end of the measuring range	reduce burden resistance
	incorrect scaling of analog output	check setting and amend if necessary
measured value too high	coefficient set too high	set coefficient at 1.000
	EMC problem	see reference to electromagnetic compatibility (EMC)



A11 Replacement Parts

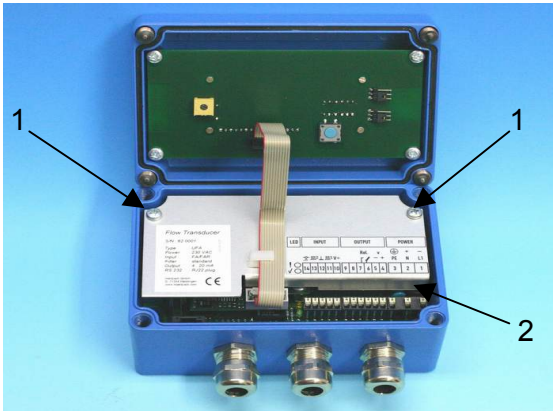


Fig. 3: Fuse TR5

Fuse TR5 (2) is situated in the base behind the power supply connecting terminals and is easily accessible by loosening the screws (1) to remove the cover plate:

for 230 V AC TR5-T 100 mA order no. e025/023
for 24 V DC TR5-T 500 mA order no. e025/024
for 12 V DC TR5-T 500 mA order no. e025/024



Always switch off before changing the fuse!