

AQUATRACE® ATT520V

Trace Moisture Transmitter 0.01-500 ppm_v | 1 - 20.000ppb_v

To measure the trace moisture content in gases

Operating Instructions



Measuring Chamber



Flange-Version



Split-Version

Inline measurement in systems with KF40 flange, with reaction chamber and Ø 6mm pipe connection (bypass solution) or with splitted reaction chamber.

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1. General

The **AQUATRACE® ATT520V** transmitter is used to monitor the moisture content in gas systems (all gases, except base gases) in the range of 0,01 – 500 ppm_v or 1-20,000 ppb_v. An analog output signal (4 – 20 mA; optionally 0 – 10 V) is provided. LEDs indicate the respective device status. Digital communication takes place via an RS232 interface (optionally RS485 Modbus-RTU).

The sensor element works according to phosphorus pentoxide technology on the basis of the electrolytic dissociation of water.

Depending on the area of application, the following device variants are used:

(A) Depending on the configuration of the measuring point

Measurement in the bypass current using a standardized reaction chamber

Inline measurement in systems with pipe flange KF25 or KF40 (Attention: only possible under constant flow conditions)

(B) Depending on the aggressiveness of the gas components

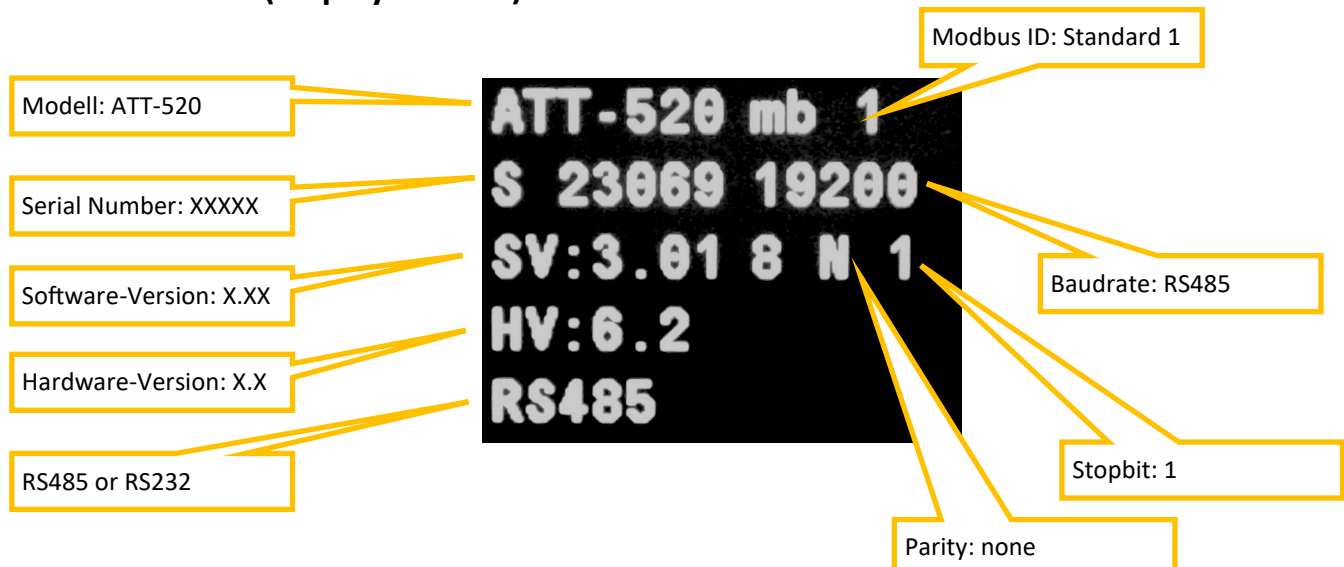
Sensor carrier glass + platinum wire + wetted housing parts made of stainless steel

Sensor carrier glass + platinum wire + wetted housing parts made of PVDF

Ceramic sensor carrier + printed interdigital structure + wetted housing parts made of stainless steel or PVDF

The instructed service technician can readjust the device to a limited extent via the serial interface and thus adapt it to the specific measurement conditions.

1.1 Start-Screen (Display-version)



2. Specifications

Operating voltage:	24 V DC
Ambient temperature:	max. 40 °C
Device versions:	KF25 or KF40 – vacuum flange Reaction chamber for bypass with 6mm pipe connectors
Display:	Status LED, 1.8" display (optional)
Lower detection limit	0.01 ppm _v (ppm variant) 1 ppb _v (ppb variant)
Measuring range:	0.01 ... 500 ppm _v or 1 ... 20,000 ppb _v
Measured value display:	1.8" display
digital interface:	RS 232 (9600, 8, n, 1) – optional RS485 with Modbus-RTU
Analog output:	4 ... 20 mA (optional 0 10 V)
Dimensions:	80 x 255 mm; immersion depth 60 mm
Weight:	0.7 kg
Connector:	A-Code M12 – 8pin; with the following pin assignment:

M12 PIN Color Description

1 white	-----	Analog OUT
2 brown	-----	Analog GND
3 green	-----	RS232 TxD out RS485 -B (-Dat)
4 yellow	-----	RS232 RxD in RS485 +A (+Dat)
5 grey or black	-----	RS232 GND RS485 GND
6 (free or pink)	-----	(no cable or not connected)
7 blue	-----	-Power Ground
8 red	-----	+ Power +24V



Material of the measuring cell:	stainless steel (V2A) – other materials on request
Material of the flange	stainless steel (V2A) – other materials on request
Sensor material:	Platinum wire on glass carrier or Platinum layer sintered on ceramic carrier
Sample gas temperature:	+5 ... +65 °C
Sample gas pressure:	maximum. 6 bar (factory calibration at atmospheric pressure)
Measurement accuracy:	+/- 5% of the display value, at least 0.4 ppm _v 2 ppb _v
Response time at humidity event:	< 1 sec

3. Commissioning

- 3.1 Gas-side connection depending on the configuration of the measuring point
 - ⇒ Sensor with protective cap for flange connection
 - ⇒ Sensor with G1/2" thread screwed into the reaction chamber in the reaction chamber
- 3.2 Electrical connection according to pin assignment

Attention: Wrong connection leads to the destruction of the device!
- 3.3 Initial coating by careful application of a thin electrolyte film
(orthophosphoric acid – **Attention: risk of corrosion!**) .
- 3.4 Excess acid should be carefully dabbed with lint-free blotting paper.
Visualization of the sensor status, communication or parameterization via serial interface
(see example point 4.)

4. Cleaning and recoating the sensor - Read carefully!

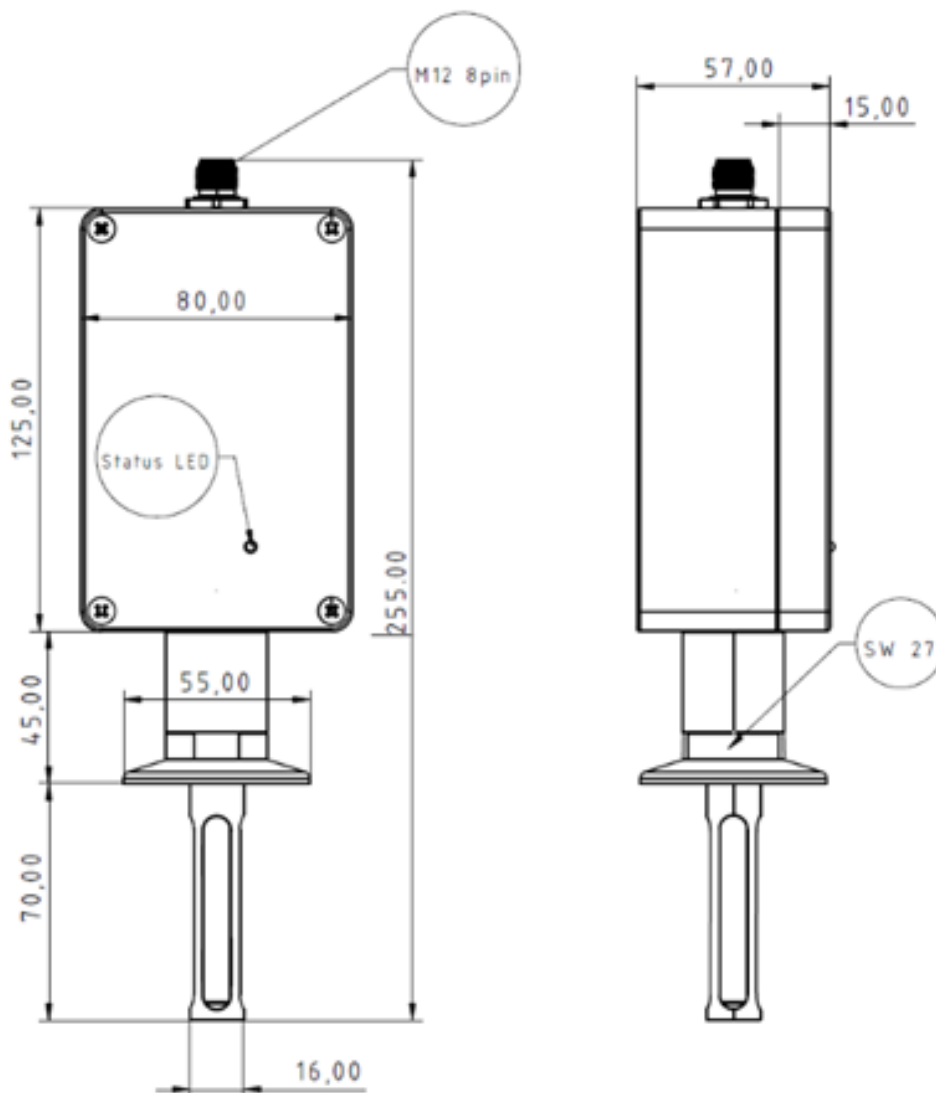
- 4.1 Unplug the sensor and/or turn off the transmitter
- 4.2 Open the measuring chamber or dis-mounting the flash-connection
- 4.3 Remove the sensor, unscrew the protective cap if necessary
- 4.4 Gently rinse the sensor under running water
- 4.5 Carefully clean and dry the sensor with lint-free blotting paper
- 4.6 Sufficiently wet the sensor with orthophosphoric acid - but not too much
- 4.7 Carefully dab any excess acid – **Attention: No acid should drop in the reaction chamber!**
No acid should touch the epoxy glue bonding
- 4.8 Insert the sensor into the reaction chamber in reverse order
- 4.9 Connecting the plug | turn on the transmitter
- 4.10 Putting the transmitter back into operation and following the "run-in process" on the LED
and, if necessary, via serial interface – can take 15 – 30 minutes

5. Hints

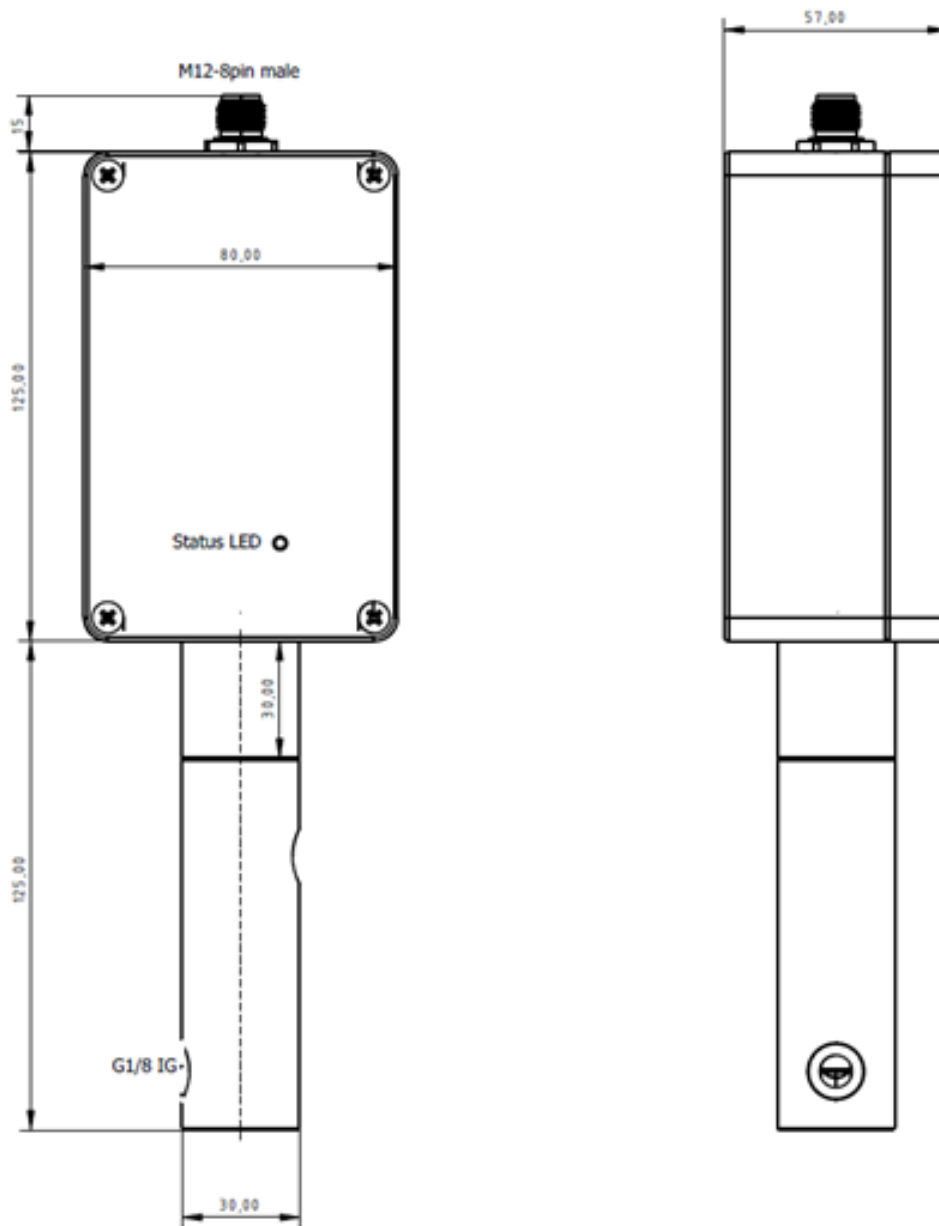
- The frequency of sensor cleaning depends on the operating conditions. The operator should gain his own experience or get in touch with us.
- Normally cleaning and recoating after 6 months.
- An initial plausibility check of the current measured values often helps.
- When handling the sensor element, the utmost care and cleanliness is required
- **Be careful when handling acid – risk of chemical burns!**

6. Dimensions

6.1 ATT520V with KF40/KF25 flange or G1/2" thread



6.2 ATT520V with measuring cell / reaction chamber



7. RS232 Interface for digital communication and adjustment/configuration

RS 232 (9600, 8, n, 1)

Serial communication consists of an alternation of question and answer. The master queries a value and the slave (transmitter) answers. The master should not send faster than 1s, otherwise communication may become unstable.

7.1 Query/command

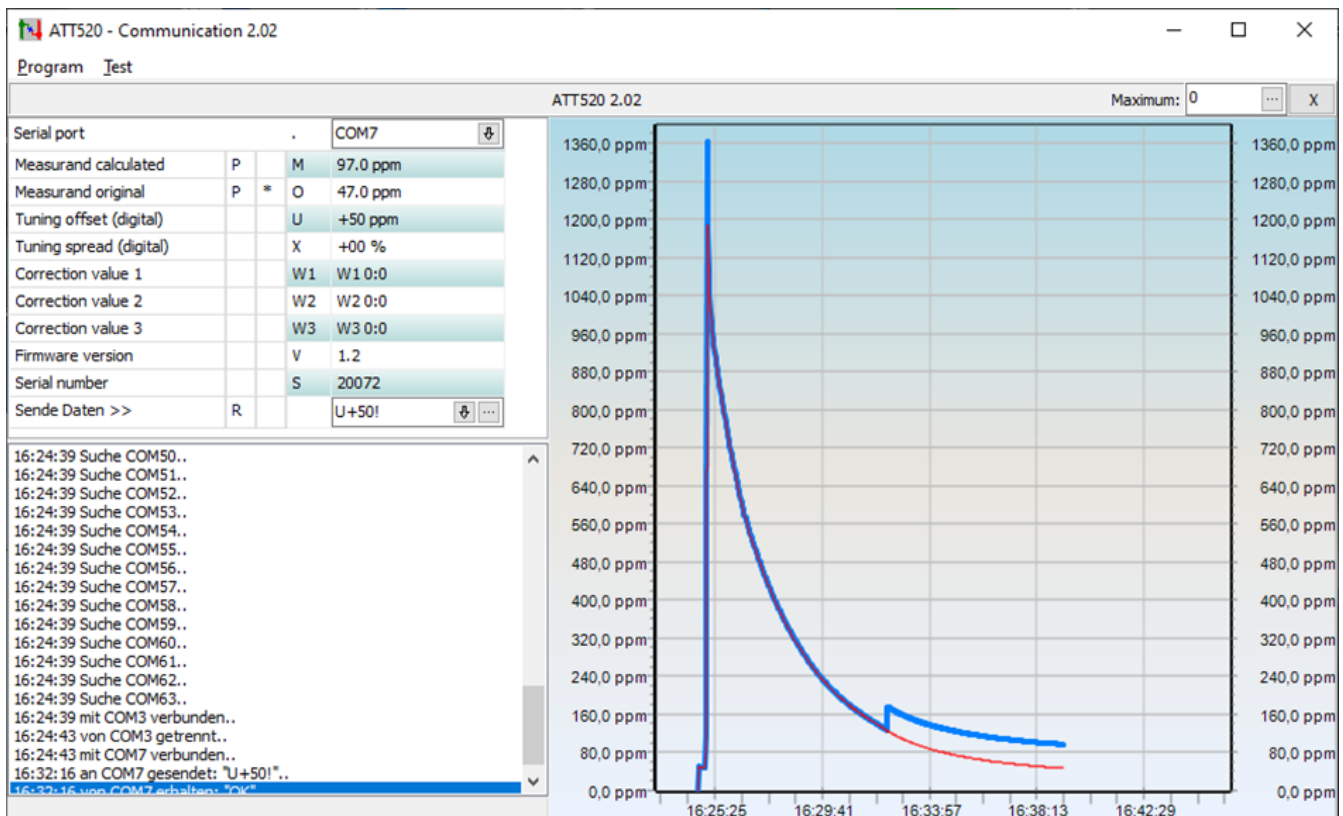
The question always consists of at least one letter that stands for the value to be queried. A command is followed by the desired value. This is followed by a ? for a query or a ! for a command. Finally, an LF (line feed) is added to signal the end of the message.

7.2 Answer

The answer consists of the letters received. This is followed by a confirmation as an echo or 1 for a command and the requested data for a query. This time the end is marked by a CR (Carriage Return) and LF (Linefeed).

The communication parameters are fixed 9600 8/N/1

7.3 Communication Utility Transmitter – PC: ATT520.exe



„**ATT520.exe**“ this is the standard communication program to communicate with the ATT-520 transmitters (only for RS232 interface). It is handed over to the customer every time a device is delivered.

for RS485 please ask us for communication software

All the important parameters that the customer needs to configure and evaluate the transmitters are available here. These include the three measured values M, N and O. The offset U, X as well as the base points W1, W2, W3 and WUX. Also available is the current software version V of the transmitter and the serial number S. The letters in the small white boxes to the left of the measured values indicate the type of query. An empty field means no query. R means one-time query. P stands for persistent query. These functions can be activated simply by clicking R and double-clicking P in the field. The star in the column next to it indicates which value is currently being queried.

Entries can be made using the white line below. The arrow opens the history of the last sent commands. The entered command is sent with the 3 dots; this can of course also be done by pressing the Enter key. The sent commands and responses can then also be seen in the white window at the bottom left. A sent command that was not accepted correctly and does not return an error. Should be resent if the response contains ppm.

The program scans all COM ports when it starts. If your transmitter is connected to a different COM port, you can simply select it using the drop-down menu above.

The three measured values are then displayed in the diagram over a maximum period of 12 hours. The y-axis with the measured value in ppm can be scaled using the Maximum field.

Unfortunately, logging measurement data into a CSV is not possible with this program.

7.4 Query/command

O?	Original measured value
N?	Standardized value = measured value + offset + support points
M?	Measured value = digital value of the analog output
D?	Dew-Point temperature (calculated)
U?	Offset (please see Offset und Span)
X?	Span (please see Offset und Span)
T?	Zero-Point Offset (please see Zero-Point Offset)
V?	Firmware-Version
ID?	Hardware modell
S?	Serial number
dm?	Measuring range
W0/1/2/3?	Base points (please see base points)
WUX?	Correction mode
H?	Temperature
min?	minimum threshold
max?	maximum threshold

7.5 Examples for changing the values:

U	Example: U+00! Range: -99 - +99 ppm/ppb
X	Example: X-99! Range: -99 - +99%
T	Example: T+01! Range: -99 - +99 ppm/ppb
dm	Example: dm500! Range: ppb 1-20 ppm ppm 10-500 ppm
W1/2/3	Example: ppm: W11000:2000! Range: 0000-5000 ppb: W213000:15000! Range: 00000-20000
WUX 0	no offset/span and no support points active 1 bases active 2 Offset/Span active
CL!	delete all corrections
min	Example: min10! Range: 0 - disabled ppm: 1-500 ppm ppb: 1-20000ppb
max	Example: max400! Range: 0 - disabled ppm: 1-500 ppm ppb: 1-20000ppb

7.6 Query list

?	Description	Example
o	Original value (only different when switching)	o 339.7 ppm
O	Original value	O 339.7 ppm
N	Standardized value	N 339.7 ppm
M	DAC-value ppm	M 339.7 ppm
D	Dewpoint	D -31.4 °C
U	Offset	U +00 ppm
X	Span	X +00 ppm
V	Version	V 0.2
S	Serial number	S 20005
dm	DAC-Max-value	dm 500
W..	Stützpunkt W1/W2/W3/W0 = all base points	W10000:0000
WUX	Correction mode 0 none active 1 bases active 2 Offset/Span active	WUX 1
H	Temperature	H 20°C
ID	Hardware modell	ID ATT520
d	DAC-value16 Bit	d 10315
min	Minimaler threshold	min 100
max	Maximaler threshold	max 500
T	Zero Point Offset	T +99
BA	Modbus Address	BA 1
BB	Modbus Baudrate	BB 19200
BP	Modbus Parity	BP 0
BS	Modbus Stopbit	BS 0
e..	2 EEPROM Zellen abfragen	e09 0012FFFF

7.7 Command list (Be carefully - It is possible that you disrupt communication)

!	Description	Example
U	Offset	U+99!
X	Span	X+99!
S	Serial number	S20001!
dm	Scaling analog output 0- ... (max. 500ppm or 20,000ppb)	dm500!
W	Base points	W1!
1	Base point 1	
2	Base point 2	
3	Base point 3	
WUX	Correction Mode (U, X and W1/2/3 will not work, if „0“)	
0	Original value: Breakpoints and offset / span are deactivated	WUX0!
1	Breakpoints set with W are activated and offset / span deactivated	WUX1!
2	Offset / Span are activated and support points set with W are deactivated	WUX2!
CL	U, X, W1/2/3, WUX set to 0 (OFF)	CL!
min	Min Threshold	min100!
max	Max Threshold	max500!
SR	Software Reset	SR!
T	Zero-Point Offset -99 - +99	T-99!
BA	Modbus Adresse 0-254	BA1!
BB	Modbus Baudrate 0-65535	BB19200!
BP	Modbus Parity none 0/odd 1/even 2	BP0!
BS	Modbus Stopbit 1=0/2=1	BS0!
DI	Display init (Display Reset)	DI!

7.9 Offset and Span

Activation: WUX2!

Query: U? Answer: U +99 ppm \r\n / U +99 ppb \r\n

X? Answer: X -01% \r\n

Command: U+99! (adds 99 ppm/ppb to reading)

X-01! (subtracts 1% from the measured value)

Description: -Offset is always effective as long as WUX is 2

7.10 Zero point offset

Query: T? Answer: T +99 \r\n / T +99 \r\n

Command: T+99! (adds 99 ppm/ppb to reading)

Description: -always effective / is not activated by CL! reset

7.11 Error codes

ERROR 01	unknown command
ERROR 02	incorrect or incomplete command
ERROR 03	Error writing to the EEPROM
ERROR 04	original value smaller than that of the previous base point or larger than that of the subsequent base point
ERROR 05	original value over measuring range or adjusted value too large
ERROR 06	Limit exceeded

7.12 Base points

Activation: WUX1!

Query:

ppm	ppb
W1? Answer: W1 0010:0050 \r\n	Answer: W1 00010:00050 \r\n
W2? Answer: W2 0100:0300 \r\n	Answer: W2 00100:00300 \r\n
W3? Answer: W3 4000:2000 \r\n	Answer: W3 04000:02000 \r\n

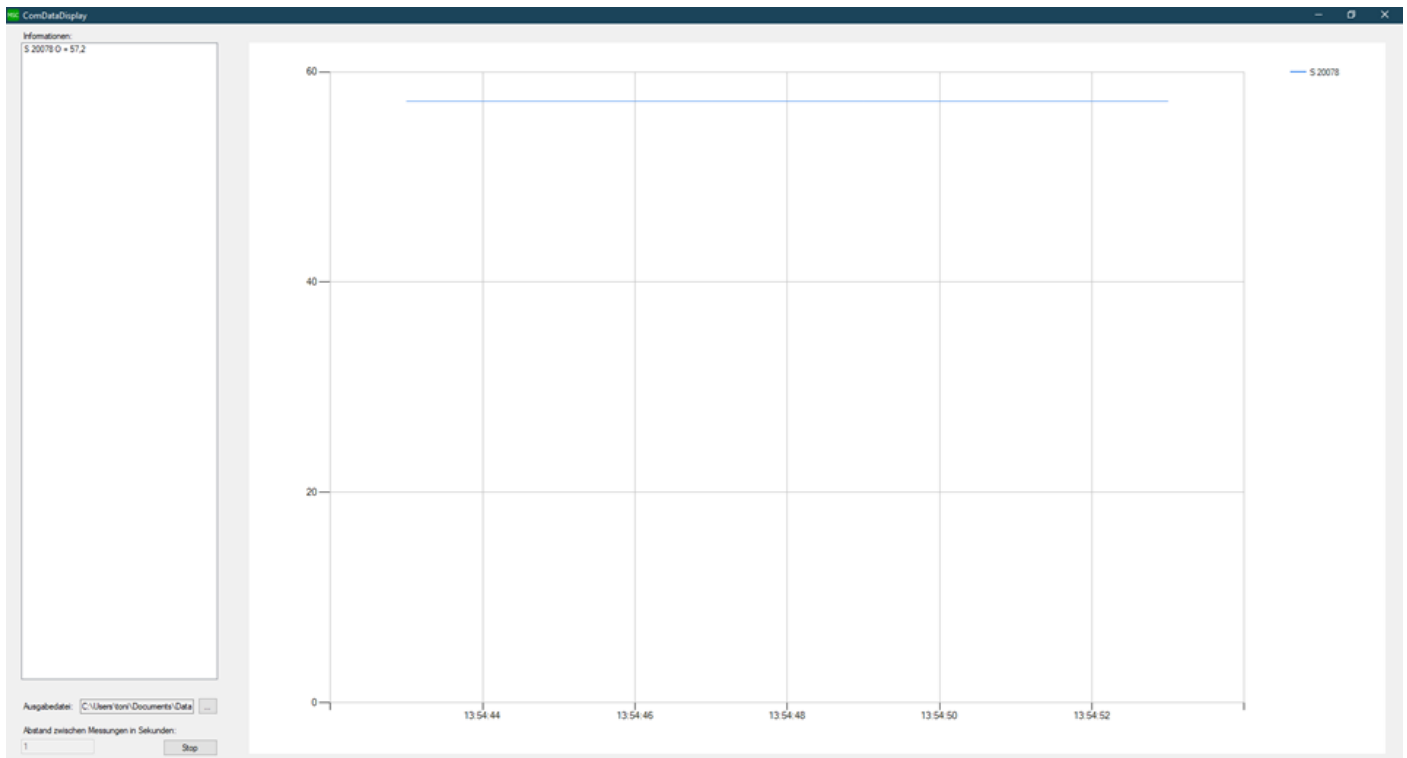
Set: W number-original value--adjusted value-

ppm	ppb
W10010:0020!	W100010:00020!
W20999:3000!	W200999:03000!
W34500:5000!	W304500:05000!

Description:

- A total of 3 bases possible
- each base can be used regardless of the order
- The original value of the new base point must always be greater than the original value of the previous base point and must not be 0
- Base points are only effective in the measuring range:
 - with ppm transmitter from 0-500 ppm
 - with ppb transmitter from 0-20000 ppb
- W0? queries all bases
- Reset the bases by command CL! to reset W1/2/3, X and U
- individual base point is reset by sending 0

8. ComDataDisplay (only for RS232)



The ComDataDisplay program is used to log data. It can easily display measurements and log them to a CSV file, but no configuration is possible. It can also log multiple transmitters simultaneously via different COM ports. When you start the program, the transmitters and COM ports found are displayed at the top left; if not, the program must be started again. You can then create a CSV file in the output file by clicking on the 3 dots and specify the storage location. The distance between the measurements can also be entered in seconds at the bottom left, minimum 1 second. Then press start and the recording begins. After the measurement has been completed, press stop and you can then save the CSV file, for example. B. evaluate in Excel.

EC Declaration of Conformity

*according to Machinery Directive 2006/42/EC
according to EMC Directive 2004/108/EC*

The manufacturer

Company
DKS GmbH Engineering & Sales
Radeberger Strasse 21
01900 Großröhrsdorf

Contact

Mathias Schneider
info@dks-engineering.de

hereby declares the followings product:

Designation: **AQUATRACE® ATT520V Trace Moisture Transmitter**

Intended use: Measuring device for trace moisture determination in gases

complies with the provisions of the guidelines marked above, including any changes in force at the time of the declaration.

The following harmonised standards have been applied:

DIN EN ISO 12100 Safety of machinery - General design principles - Risk assessment and risk reduction.

The following relevant harmonised European standards have been used to assess the product with regard to electromagnetic compatibility:

Immunity according to EN 61000-6-2 (immunity for industrial use)

EN 61000-4-2, EN 61000-4-3 and EN 61000-4-4

Interference emission according to EN 55011

Limit values according to class B (residential area) are adhered to

**Location: Großröhrsdorf,
Date: 12.07.2021**

**Mathias Schneider
CEO**

Annotation:

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