# Modbus Register
# AMTAX SC

V2.20

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# AMTAX SC V2.20

| Name | Register | Data Type | Length | Access Mode | Discrete Range | Min / Max | Description |
|---|---|---|---|---|---|---|---|
| MEASURE VALUE 1 | 40001 | Float | 2 | R | | ? | actual measurement value from channel one |
| CHANNEL1 | 40005 | String | 8 | R/W | | | Name of LOCATION 1 (see menu system) |
| MEAS.UNITS 1 | 40013 | Unsigned Integer | 1 | R/W | U0 /2 | | Measurement units for channel one; 0=mg/l, 2=ppm |
| CUVETTE TEMP. | 40014 | Float | 2 | R | | -50 /99.99 | actual cuvette temperature in °C |
| CALIB.INTERVAL | 40016 | Unsigned Integer | 1 | R/W | 0 /5 /1 /2 /3 /4 | | it describes how often the analyzer calibrates; 0=OFF, 1=12h,2=24h, 3=36h, 4=48h |
| CALIB.START | 40017 | Unsigned Integer | 1 | R/W | 0 /1 /2 /3 /4 /5 /6 /7 /8 /9 /10 /11 /12 /13 /14 /15 /16 /17 /18 /19 /20 /21 /22 /23 | | it describes when the analyzer starts the calibration (24 hour format) 0=0 o`clock to23=23o´clock |
| ENCLOSURE TEMP | 40020 | Float | 2 | R | | -50 /99.9 | the temperature inside the analyzer |
| mV STANDARD1 | 40022 | Float | 2 | R | | -3000 /3000 | the voltage in mV for the standard one sample |
| mV STANDARD2 | 40024 | Float | 2 | R | | -3000 /3000 | the voltage in mV for the standard two sample |
| mV ZERO | 40026 | Float | 2 | R | | -3000 /3000 | the voltage in mV for the citro sample |
| mV SAMPLE | 40028 | Float | 2 | R | | -3000 /3000 | the voltage in mV for the sample (last measurement) |
| mV ACTIVE | 40030 | Float | 2 | R | | -3000 /3000 | the voltage in mV for the current sample (actual mV) |
| AMMONIUM-N 2 | 40032 | Float | 2 | R | | ? | measurement value for channel two as NH4-N |
| AMMONIUM 2 | 40034 | Float | 2 | R | | ? | measurement value for channel two as NH4 |
| AMMONIUM-N 1 | 40036 | Float | 2 | R | | ? | measurement value for channel one as NH4-N |
| AMMONIUM 1 | 40038 | Float | 2 | R | | ? | measurement value for channel one as NH4-N |
| PROBE P. MIN | 40040 | Float | 2 | R | | 0 /2.0 | integrated value of pressure at filtration probe, if not yet calculated: nan |
| PROBE PRESSURE | 40042 | Float | 2 | R | | 0 /2.0 | actual value of pressure at filtration probe, if not yet calculated: nan |
| GAIN CORR. 1 | 40044 | Float | 2 | R/W | | 0.01 /100.00 | Gain correction for channel one |
| mV SLOPE | 40046 | Float | 2 | R | | -3000 /3000 | SLOPE of electrode |
| BUSACTION ACTIVE | 40048 | Unsigned Integer | 1 | R/W | | 0 /1 | write a one to this register to start a bus action (see Field bus control) |
| BUS ANALY.START | 40049 | Unsigned Integer | 1 | R/W | | 0 /1 | you can start the analyzer about the bus |
| BUS SERVICE | 40050 | Unsigned Integer | 1 | R/W | | 0 /1 | you can start the service mode about the bus |
| BUS CLEANING | 40051 | Unsigned Integer | 1 | R/W | | 0 /1 | you can start the cleaning mode about the bus |
| BUS CALIBRATION | 40052 | Unsigned Integer | 1 | R/W | | 0 /1 | you can start the calibration mode about the bus |
| BUS CLEAN/CAL. | 40053 | Unsigned Integer | 1 | R/W | | 0 /1 | you can start the cleaning/calibration mode about the bus |
| BUS PREPUMP REA. | 40054 | Unsigned Integer | 1 | R/W | | 0 /1 | you can prepump reagent about the bus |
| BUS PREPUMP CLEA | 40055 | Unsigned Integer | 1 | R/W | | 0 /1 | you can prepump cleaning solution about the bus |
| BUS PREPUMP STA. | 40056 | Unsigned Integer | 1 | R/W | | 0 /1 | you can prepump standards about the bus |
| BUS PREPUMP PRO. | 40057 | Unsigned Integer | 1 | R/W | | 0 /1 | you can prepump the probe about the bus |
| BUS PREPUMP ALL | 40058 | Unsigned Integer | 1 | R/W | | 0 /1 | you can prepump all about the bus |
| DISCHARGE CALIB. | 40067 | Unsigned Integer | 1 | R/W | | 0 /10 | discharged values after a calibration |
| REMAINING TIME | 40068 | Unsigned Integer | 1 | R | | 0 /65535 | remaining time of the current process |

| Name | Register | Data Type | Length | Access Mode | Discrete Range | Min / Max | Description |
|---|---|---|---|---|---|---|---|
| APPL. | 40069 | Float | 2 | R | | 0 /3.40282347 E+38 | version of application file |
| HEATING ON | 40071 | Unsigned Integer | 1 | R/W | 0 /1 /2 /3 /4 /5 /6 /7 /8 /9 /10 /11 /12 | | sets the month when the sample line heating is switched ON; 0=alway OFF, 1=January, 2=Febraury to 12=December |
| HEATING OFF | 40072 | Unsigned Integer | 1 | R/W | 1 /2 /3 /4 /5 /6 /7 /8 /9 /10 /11 /12 | | sets the month when the sample line heating is switched OFF;1=January, 2=Febraury to 12=December |
| CLEANING MODULES | 40073 | Time2 | 2 | R/W | | | Date of last filter module cleaning |
| SET PARAMETER 1 | 40075 | Unsigned Integer | 1 | R/W | P19 /42 | | Chose the parameter for channel one; 19=NH4-N, 42=NH4 |
| AIR FILTER DISPL | 40076 | Integer | 1 | R/W | | -32768 /32767 | days until next cleaning/exchange of air filter pads. Negative values show a cleaning which is overdue |
| COOLING | 40077 | Unsigned Integer | 1 | R | | 0 /100 | percentage of cooling fan power |
| ANALYZER HEATING | 40078 | Unsigned Integer | 1 | R | | 0 /100 | the heating of the analyzer |
| INTERVAL | 40080 | Unsigned Integer | 1 | R/W | 0 /1 /2 /3 /4 /5 /6 /7 /8 /9 /10 /11 /12 /13 /14 /15 /16 /17 /18 /19 /20 /21 /22 /23 | | 0=5 minutes, 1 =10minutes, 2=15 minutes to 23=120 minutes |
| CLEANING START | 40081 | Unsigned Integer | 1 | R/W | 0 /1 /2 /3 /4 /5 /6 /7 /8 /9 /10 /11 /12 /13 /14 /15 /16 /17 /18 /19 /20 /21 /22 /23 | | it describes when the analyzer starts the cleaning (24 hour format) 0=0 o`clock to23=23o´clock |
| STATUS MODULES | 40082 | Unsigned Integer | 1 | R | | 0 /100 | the state of the modules as integer in percent |
| NEW MODULES | 40083 | Time2 | 2 | R/W | | | date of the last filter module exchange |
| CLEAN. INTERVAL | 40085 | Unsigned Integer | 1 | R/W | 0 /1 /3 /6 /8 /12 /24 | | cleaning intervall ; 0=OFF, 1=1h, 3=3h, 6=6h, 8=8h, 12=12h, 24=24h |
| SET OUTMODE CAL. | 40086 | Unsigned Integer | 1 | R/W | 0 /1 /2 | | Set output mode for calibration; 0=HOLD, 1= TRANSFER VALUE |
| DISCHARGE CLEAN. | 40087 | Unsigned Integer | 1 | R/W | | 0 /10 | discharged values after a cleaning |
| SET OUTMODE CLE. | 40088 | Unsigned Integer | 1 | R/W | 0 /1 /2 | | Set output mode for cleaning; 0=HOLD, 1= TRANSFER VALUE |
| SET OUTMODE SER. | 40089 | Unsigned Integer | 1 | R/W | 0 /1 /2 | | Set output mode for service mode; 0=HOLD, 1= TRANSFER VALUE |
| CHANNEL2 | 40090 | String | 8 | R/W | | | location for the measuring channel two where the sample is coming from |
| SET PARAMETER 2 | 40098 | Unsigned Integer | 1 | R/W | P19 /42 | | Chose the parameter for channel two; 19=NH4-N, 42=NH4 |
| GAIN CORR. 2 | 40099 | Float | 2 | R/W | | 0.01 /100.00 | Gain correction for channel two |
| MEAS.UNITS 2 | 40101 | Unsigned Integer | 1 | R/W | U0 /2 | | Measurement units for channel two; 0=mg/l, 2=ppm |
| HUMIDITY ANALY | 40102 | Unsigned Integer | 1 | R | | 0 /100 | humitity analyzer in percent |
| SOFTWARE PROBE | 40103 | Float | 2 | R | | 0 /3.40282347 E+38 | the softwareversion of the filtration probe |
| HUMIDITY PROBE | 40105 | Unsigned Integer | 1 | R | | 0 /100 | humitity filtration probe in percent |

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|---|---|---|---|---|---|---|---|
| PROCESS STATE | 40107 | Unsigned Integer | 1 | R | 0 /1 /2 /3 /4 /5 /6 /7 /8 /9 /10 /11 /12 /13 /14 /15 /16 /17 /18 /19 /20 | | process state is coded as enum list; enum value 0=service mode, enum value 1=citrocal in proc, cal1 in proc., cal2 in proc., measuring 1…, interval, initialisation, serv.in proc., cleaning, warm up phase, measuring 2…, prepump reag., prepump clean.,prepump standard, prepumping probe, flushing, start by bus, warming up, reserved, prepump.sample; enum value 20=validation |
| LAST CALIBRAT. | 40108 | Time2 | 2 | R | | | the date of the last calibration |
| START BY BUS | 40110 | Unsigned Integer | 1 | R/W | 0 /1 | | sets the analyzer to START BY BUS mode ( see Start by bus) |
| FIELDBUS | 40111 | Unsigned Integer | 1 | R/W | | 0 /2 | trigers a measurement serie in START BY BUS mode (see Start by bus) |
| NUMBER OF MEAS. | 40112 | Unsigned Integer | 1 | R/W | | 1 /100 | Number of measurements in a START BY BUS measurement series (see Start by bus) |
| DISCHARGE BUS | 40113 | Unsigned Integer | 1 | R/W | | 0 /10 | discharge values at the beginning of a START BY BUS series |
| AVERAGE | 40114 | Unsigned Integer | 1 | R/W | | ? | The number of measurement values that result in an average value in a START BY BUS measurement series. |
| NO.OF VALUES CH1 | 40115 | Unsigned Integer | 1 | R/W | | 0 /100 | 2 channel mode: how often is channel 1 measured before switching to channel 2 |
| NO.OF VALUES CH2 | 40116 | Unsigned Integer | 1 | R/W | | 0 /100 | 2 channel mode: how often is channel 2 measured before switching to channel 1 |
| DISCHARGE VAL1 | 40117 | Unsigned Integer | 1 | R/W | | 0 /3 | number of discharged values when switching from channel 2 to channel 1 |
| DISCHARGE VAL2 | 40118 | Unsigned Integer | 1 | R/W | | 0 /3 | number of discharged values when switching from channel 1 to channel 2 |
| REAG. WARNING | 40119 | Unsigned Integer | 1 | R/W | 0 /1 | | warning if the level of reagent is low; 0=OFF, 1=ON |
| TYPE | 40125 | String | 6 | R | | | name of the item/analyzer |
| SENSOR NAME | 40131 | String | 8 | R | | | User-assigned name for a sensor |
| STATUS MODULES | 40140 | Float | 2 | R | | 0 /100 | the state of the modules as float in percent; nan if not yet calculated |
| WARNING | 40142 | Unsigned Integer | 1 | R/W | 20 /15 /10 /5 | | Reagent warning level in percent |
| REAGENT LEVEL | 40143 | Unsigned Integer | 1 | R/W | | 0 /100 | the level of reagent in percent |
| CLEAN SOLU LEVEL | 40144 | Unsigned Integer | 1 | R/W | | 0 /100 | cleaninig solution level in percent |
| STANDARDS LEVEL | 40146 | Unsigned Integer | 1 | R/W | | 0 /100 | level of standards in percent |
| REPLACE ELECTRO. | 40148 | Time2 | 2 | R/W | | | date of last electrode exchange |
| CHANGE MEMBRANE | 40150 | Time2 | 2 | R/W | | | date of last membrane exchange |
| PUMP DISPLAY | 40154 | Integer | 1 | R/W | | -32768 /32767 | days lest until exchanging piston of pump, negative values show that exchange is overdue |
| MEASURE VALUE 2 | 40165 | Float | 2 | R | | ? | last measurement value of channel 2 |
| STRUCTURE | 40167 | Unsigned Integer | 1 | R | | 0 /65535 | the entry is for the device driver file;shows the version |
| FIRMWARE | 40168 | Unsigned Integer | 1 | R | | 0 /65535 | the entry is for the device driver file;shows the version |
| CONTENT | 40169 | Unsigned Integer | 1 | R | | 0 /65535 | the entry is for the device driver file;shows the version |
| LOADER | 40170 | Float | 2 | R | | 0 /3.40282347 E+38 | the entry is for the application file;shows the version of the boot file |
| HEATING | 40172 | Unsigned Integer | 1 | R | 0 /1 | | status off heating for sample tube; 0=OFF, 1=ON |
| OPERATING HOURS | 40173 | Unsigned Integer | 2 | R/W | | 0 /99999999 | operating hours of analyzer |

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|---|---|---|---|---|---|---|---|
| PUMP MEMBR.DISP. | 40177 | Integer | 1 | R/W | | -32768 /32767 | remaining days for pump membrane in filter probe |
| COMPRESSOR | 40186 | Integer | 1 | R/W | | -32768 /32767 | remaining days for air compressor |
| LAST CHA.FACTOR1 | 40194 | Time2 | 2 | R/W | | | the date of the last correction factor for channel one |
| LAST CHA.FACTOR2 | 40196 | Time2 | 2 | R/W | | | the date of the last correction factor for channel two |
| SAMPLE DETECTION | 40218 | Unsigned Integer | 1 | R/W | 0 /1 /2 | | output if sample detection detects low sample amount; 0=Warning, 1=Error 2=OFF |
| ACTUAL MEAS.TIME | 40224 | Time2 | 2 | R | | | time of actual measurement value |
| LAST TIME | 40226 | Time2 | 2 | R | | | time of last measurement value |
| 2.ND LAST TIME | 40228 | Time2 | 2 | R | | | 2.ND LAST TIME |
| 3.RD LAST TIME | 40230 | Time2 | 2 | R | | | 3.RD LAST TIME |
| 4.TH LAST TIME | 40232 | Time2 | 2 | R | | | 4.TH LAST TIME |
| 5.TH LAST TIME | 40234 | Time2 | 2 | R | | | 5.TH LAST TIME |
| 6.TH LAST TIME | 40236 | Time2 | 2 | R | | | 6.TH LAST TIME |
| 7.TH LAST TIME | 40238 | Time2 | 2 | R | | | 7.TH LAST TIME |
| 8.TH LAST TIME | 40240 | Time2 | 2 | R | | | 8.TH LAST TIME |
| 9.TH LAST TIME | 40242 | Time2 | 2 | R | | | 9.TH LAST TIME |
| ACTUAL VALUE | 40244 | Float | 2 | R | | 0 /15000 | actual measurement value, not channel dependent |
| LAST VALUE | 40246 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 2.ND LAST VALUE | 40248 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 3.RD LAST VALUE | 40250 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 4.TH LAST VALUE | 40252 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 5.TH LAST VALUE | 40254 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 6.TH LAST VALUE | 40256 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 7.TH LAST VALUE | 40258 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 8.TH LAST VALUE | 40260 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| 9.TH LAST VALUE | 40262 | Float | 2 | R | | 0 /15000 | LIST OF VALUES |
| STAT. MODUL.WAR. | 40266 | Unsigned Integer | 1 | R/W | 40 /30 /15 | | configure the level of warning for the state of the modules |
| STATUS MODUL.ERR | 40267 | Unsigned Integer | 1 | R/W | 14 /10 /8 /0 | | configure the level of error for the state of the modules |
| ENCLOSU.TEMP.MAX | 40268 | Float | 2 | R | | -50 /200 | the maximum temperature inside the analyzer during the last 24 hours, intervall starts with power on |
| ENCLOSU.TEMP.MIN | 40270 | Float | 2 | R | | -50 /200 | the minimum temperature inside the analyzer during the last 24 hours, intervall starts with power on |
| EXHAUST CONTROL | 40272 | Unsigned Integer | 1 | R/W | 0 /1 | | the analyzer is checking the exhaust whether it is blocked; 0=OFF, 1=ON |
| ELECTROLYTE | 40277 | Integer | 1 | R/W | | -32768 /32767 | days left until next electrolyte change, neg. values show overdue |
| ELECTROLYTE | 40278 | Unsigned Integer | 1 | R/W | 0 /1 | | Sets if there is a warning when electrolyte has to be exchanged; 0=OFF, 1=WARNING |
| FALSE ELEC DATA | 40279 | Unsigned Integer | 1 | R/W | 0 /1 | | Sets if there is an error if the ZERO value is out of range; 0=OFF, 1=ERROR |
| ERROR LIST | 40280 | Unsigned Integer | 2 | R | | 0 /4294967295 | Errors are coded bit wise. bit 0=TEMP. < 0 °C/ 32°F?,bit 1=ANALYZ. TO COLD, COOLING FAILED,HUMIDITY ANALY, HUMIDITY PROBE; PROBE MISSING, NO HEAT UP, CUVSENSOR DEFECT, TEMPSENS DEFECT, CUVHEAT DEFECT, CUV TOO HOT,ELECTRODE SLOPE, FALSE ELEC DATA, MODULES CONTAM., DRAIN BLOCKED, SAMPLE1, bit 16= SAMPLE2 |

| Name | Register | Data Type | Length | Access Mode | Discrete Range | Min / Max | Description |
|---|---|---|---|---|---|---|---|
| WARNING LIST | 40282 | Unsigned Integer | 2 | R | | 0 /4294967295 | Warnings are coded bit wise, bit 0= WARMUP PHASE,bit 1 =COOLING DOWN, SERVICE MODE, REAGENT LEVEL,CLEAN SOLU LEVEL, ANALYZER TO COLD, ANALYZER TO WARM, CUV TOO COOL,MODULES CONTAM., STANDARDS LEVEL, ELECTRODE SLOPE, reserved,SAMPLE1, ELEKTROLYTE, bit 14=SAMPLE2 |
| EDIT NAME | 40285 | String | 8 | R/W | | | Name of LOCATION (see menu system) |
| ELECTROLYTE | 40293 | Float | 2 | R | | | electrode drift per 24h in mV |
| Offset1 | 40302 | Float | 2 | R/W | | ? | offset correction for channel one |
| Offset2 | 40304 | Float | 2 | R/W | | ? | offset correction for channel two |

## ALL Sensors and Analyzer: Classified ERROR Word - Register 49930

**Table 2 Error register**

| Bit | Error | Description |
|---|---|---|
| 0 | Calibration error | Faulty calibration detected |
| 1 | Electronic settings error | Faulty electronic calibration/settings |
| 2 | Cleaning error | Error in cleaning cycle detected |
| 3 | Measuring module error | Error in measuring module detected |
| 4 | System initialization | Inconsistent settings detected, reset to factory settings |
| 5 | Hardware error | Faulty hardware detected |
| 6 | Internal communication error | Internal communication error detected |
| 7 | Humidity error | Excessive humidity detected |
| 8 | Excessive temperature | Excessive temperature detected |
| 9 | | |
| 10 | Sample feed warning | Error in sample feed detected |
| 11 | Questionable calibration warning | Accuracy of previous calibration inadequate |
| 12 | Questionable measurement warning | Accuracy of previous measurement inadequate/out of range |
| 13 | Safety warning | Safety equipment error detected |
| 14 | Reagent warning | Reagent warning, e.g. fill level < min detected |
| 15 | Service request warning | Service request detected |

## ALL Sensors and Analyzer: Classified STATUS Word - Register 49931

**Table 3 Status register**

| Bit | Status 1 | Description |
|---|---|---|
| 0 | Calibration activated | Calibration in progress, measurement value not up to date |
| 1 | Cleaning activated | Cleaning in progress, measurement value not up to date |
| 2 | Service mode activated | Device in "Service" mode, measurement value not up to date |
| 3 | General error message | General error detected, refer to error text for details |
| 4 | Measurement value channel 0, poor quality | Measurement accuracy is not within specified limits |
| 5 | Measurement value channel 0, range short-fall | Measurement value falls short of the specified range |
| 6 | Measurement value channel 0, range exceeded | Measurement value exceeds the specified range |
| 7 | Measurement value channel 1, poor quality | Measurement accuracy is not within specified limits |
| 8 | Measurement value channel 1, range short-fall | Measurement value falls short of the specified range |
| 9 | Measurement value channel 1, range exceeded | Measurement value exceeds the specified range |
| 10 | Measurement value channel 2, poor quality | Measurement accuracy is not within specified limits |
| 11 | Measurement value channel 2, range short-fall | Measurement value falls short of the specified range |
| 12 | Measurement value channel 2, range exceeded | Measurement value exceeds the specified range |
| 13 | Measurement value channel 3, poor quality | Measurement accuracy is not within specified limits |
| 14 | Measurement value channel 3, range short-fall | Measurement value falls short of the specified range |
| 15 | Measurement value channel 3, range exceeded | Measurement value exceeds the specified range |