

AP Sensing

Modbus TCP

N45xxA DTS series

User's Guide

Notices

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1 Introduction

An N45 series DTS can be equipped with an integrated Modbus TCP slave interface (Option P01), which provides data that can be polled with an appropriate Modbus master system.

The holdings and coils in the N45 Modbus interface are divided into virtual unit ID's. Each unit ID handles a specific amount of coils and holdings. The available amount of coils and holdings per unit ID depends on the DTS channel option. For example, a four channel DTS comes with four unit ID's; a twelve channel DTS comes with twelve unit ID's. The available holding and coil register per unit ID are shown in Table 1.

Channels	Unit ID	# Holdings per unit	# Coils per unit
1	1	16.384	3.000
2	2	8.192	1.500
4	4	4.096	750
8	8	2.048	375
12	12	1.365	250
24	24	682	125

Table 1 Available Holdings and Coils

A register holding can contain integer values ranging from -32768 to 32767 and represent, among other things, measured temperatures and time stamps. An overview of the value ranges and default values for all available Modbus holdings can be found in Table 2. To enable more precise readings by including decimal numbers in the provided integer values, some *Register Type* values provide the readings multiplied by a factor. This is reflected in their name by a suffix representing this factor. TempMax100 for example has the suffix 100 and holds the TempMax value multiplied by 100. To recalculate the correct value, the Modbus master software must divide the received value by its respective suffix.

The coils in the Modbus protocol contain Boolean values (0 or 1). The default status value is 0, which means that, depending on the configuration, either no alarm is triggered or no fiber break is detected. It changes to 1 if there is e.g. an alarm in the particular alarm zone or a fiber break is detected.

The Modbus registers can be configured in the *Web Browser Interface*. To read out information over Modbus, the Modbus Master must be connected to the DTS via LAN and the specific IP address of the DTS assigned to the corresponding LAN port needs to be known by the master. The Modbus TCP connection is provided via port 502. Make sure that port 502 is open within the Modbus Master firewall and in any firewall in the network between the DTS and the master.

The Modbus poll rate shall not be faster than 500 ms to avoid server overloads. 126 Holdings can be polled at once. That means not more than 126 holding values are provided within one poll.

Note: All dimensions in this User's Guide are based on the metric system. Anyhow, the Web Browser Interface supports also the visualization of the range in feet and the temperature in °F. Switching to those units does not change the Modbus outputs. They are always provided in meters and °C.

2 Configuration in the Web Browser Interface

Go to: Web Browser Interface Main Menu → Modbus

The Modbus configuration menu can be opened via the *Modbus* tile within the *Main Menu* of the N45 web browser interface, see Figure 1.

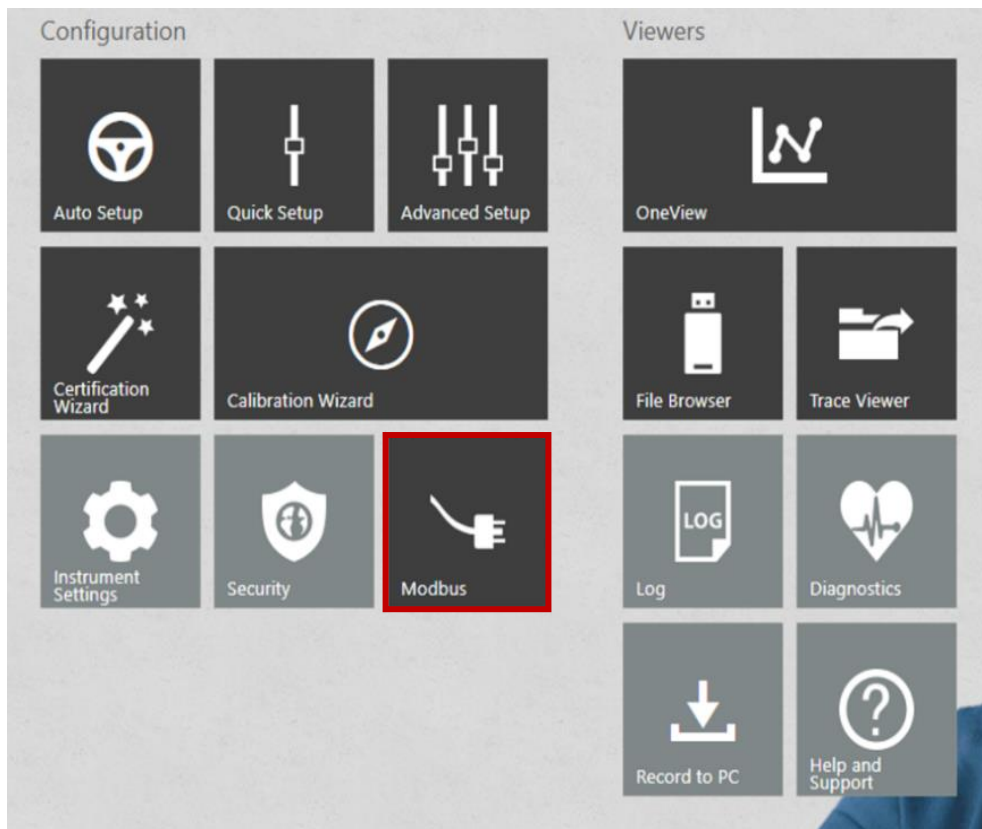


Figure 1 Modbus tile within the Main Menu

The *Setting Number* column in the Modbus *Coils* and *Holdings* tabs is related to the sequence number entry counted up from top to bottom starting with 1 at the top (see Figure 2). It is not related to the channel numbers.

As shown in Figure 2 the configuration of channel 4 is the second entry within the measurement sequence. To assign e.g. an alarm on the fiber connected to channel 4 to a Modbus holding register the setting number 2 has to be used in the Modbus configuration column *Setting number*.

Note: AP Sensing recommends sorting the settings within the measurement sequence in the ascending order of the DTS channels.













# of sequence entry		Name	Channel	setting number for Modbus
1	   	Configuration_Ch1	1	1
2	   	Configuration_Ch4	4	2
3	   	Configuration_Ch6	6	3

Figure 2 Setting numbering for the Modbus configuration

The *setting number* can be set to 0, which provides a toggling output, representing the value from the last measured setting in the measurement sequence. For example, a sequence with 3 settings is measuring and the setting 2 measurement was just finished and now setting 3 is measured, the value from the finished setting 2 is provided until setting 3 is finished, then the value is updated to the setting 3 value and so on.

Choosing a *setting number* of 1,2,3,... instead is only related to the selected setting and holds this value until this specific setting measurement is finished again and the provided value is updated.

Note: The toggling timing depends on the measurement times of all enabled settings in the sequence.











← Modbus

Modbus

Holdings Coils

Save Discard **Unsaved changes detected. Save changes or revert to the DT...**

Add Clone Delete Delete all

	Line	Unit id	Holding register	Setting number	Zone nr / Value
		Filter by...	Filter by...	Filter by...	Filter by...
 	1	1	0	1	0
 	2	1	1	1	1
 	3	1	2	1	2
 	4	1	3	1	3
 	5	1	4	1	4

Alarm
AlarmAccu
BufferStatus
DistanceOfFirstItem
FiberBreak
FireDetected
FireDirection
FirePosition
FireSizeAbsolute
FireSizeClass
FireTempMax10
FireTempMax100
FireTempMin10
FireTempMin100
Hour
LengthOfTrace
MinuteSecond
MonthDay
NumberOfDataPoints
OpticTemp10
Value

Import Export

Figure 3 Modbus Holdings tab - Register Configuration

The Modbus interface can be configured in the *Modbus* tile in the *Web Browser Interface* (see Figure 3). To set up registers directly in the configuration table just press “Add”. A new line will appear, filled with default values. When changes are done, the new configuration must be saved by pressing the *Save* button.

Note: A direct change, as well as the csv import and export function, and also saving of the updated Modbus configuration tables is possible even when a measurement is running.

Fire related values:

All values containing a *Fire* in their name are related to fires. Fires are not circumscribed by any alarm zones, but triggered by alarm criteria configured within alarm zones. Fires are divided in *fire classes*. The factory default classes are shown in Figure 4. A fire belongs to fire class *n* if $ClassSize_{n-1} < Size_{fire} \leq ClassSize_n$. A fire belongs to the largest fire class even if it is larger than the corresponding *ClassSize*.

Fire classes

Add
Clone
Delete

	Name	ClassSize	ClassOutputs
✎ 📄 🗑	Fire class 1	5	-----
✎ 📄 🗑	Fire class 2	10	-----
✎ 📄 🗑	Fire class 3	50	-----
✎ 📄 🗑	Fire class 4	100	-----
✎ 📄 🗑	Fire class 5	500	-----

Figure 4 Default fire classes

Fires are internally sorted by size and specific characteristics of the largest 10 fires can be provided via holdings. Therefore, the *Zone nr / Value* for fire register types refers to the internal *sorting value*. 1 refers to the largest fire. 10 to the 10th largest one.

3 Available Register Types

In this chapter all register types, available in the DTS internal Modbus configuration, are discussed and examples are provided. Some register types are configured equally so they are summarized in one explanation block. Some of the registers are related to the Multi Sensor Board (MSB) hardware option and are described in Section 3.2.

Note: Some register types require specific active alarm settings within the prompted alarm zone. For example: A minimum temperature will only be calculated and provided in Modbus TCP if a minimum alarm has been created and activated in the prompted alarm zone. See Table 2 for more information.

For all register types examples are provided. Those examples are using the notation from the corresponding csv files:

1; 1010; Alarm; 2; 3

This corresponds to the following row entries in the Web Browser Interface:

Unit ID	Holding/Coil register	Register type	Setting number	Zone nr / Value
1	1010	Alarm	2	3

A short row description is given below:

Unit ID: DTS channel option related ID number. For more details see Chapter 1.

Holding/Coil register: The Modbus register number. This number has to be unique for each unit ID.

Register type: Describes the provided value.

Setting number: Can be any available setting number in the measurement sequence or 0 for a setting toggling output. For more information refer to Table 2 and Chapter 2.

Zone nr /value: Represents either the alarm zone value or any other indices related to the register type. For more information refer to Table 2.

In general, all register types containing an *Alarm* in their name (except AlarmBGradXTemp100 and AlarmBGradXTime) are *non-latching*. That means if the register type criteria is not fulfilled anymore the output will flip back to its default without any required acknowledging. Only register types containing an *Accu* as suffix in their name are *latching* until a manual reset via a SCPI command or an alarm reset in the Web Browser Interface or a measurement restart takes place.

3.1 Register Holdings

Go to: Web Browser Interface Main Menu → Modbus → Holdings

- **Alarm, AlarmB, AlarmAccu, AlarmBAccu, AlarmAorB, AlarmAorBAccu,**
These alarm commands reflect if there is a temperature alarm event in one specific alarm zone (output value 1 for an alarm, value 0 for no alarm). The values are available for Measurement A or B and also as logical or (disjunction) in the *AorB* containing commands. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the alarm zone number is selected.

Examples:

1; 1010; Alarm; 2; 3

This exports the value 1 in case of a temperature event in alarm zone 3 of setting 2 into unit ID 1, holding register 1010.

1; 2002; AlarmAorB; 2; 5

This exports the value 1 in case of a temperature event in Measurement A or B (or both) in alarm zone 5 of setting 2 into unit ID 1, holding register 2002.

- **PointAlarm, PointAlarmAccu**

These commands show if an alarm is present at a specific sample point. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the sample point is selected.

Example:

1; 674; PointAlarm; 4;3

This exports the value 1 in case of a temperature event in zone 3 of setting 4 into unit ID 1, holding register 674.

- **SystemStatus**

Indicates if the DTS is connected via LAN or not. In case the DTS is connected, it returns 1. If not connected a 0 is returned. The *Setting number* and the *Zone nr / Value* must be set to 0.

Example:

1;2420; SystemStatus; 0; 0

This exports the value 1, in case the DTS is connected via LAN into unit ID 1, holding register 2420.

- **LengthOfTrace**

Shows the length in meters of the configured span. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* needs to be set to 0.

Example:

1; 5001; LengthOfTrace; 2; 0

This provides the measured trace distance of setting 2 in holding register 5001 of unit ID 1.

- **NumberOfDataPoints**

Provides the number of sample points in the span (*Span* [in m] divided by the *Sampling Interval* [in m]). The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* needs to be set to 0.

Example:

1; 264; NumberOfDataPoints; 2; 0

This provides the number of sample points in the span of setting 2 in holding register 264 of unit 1.

- **FiberBreak**

Provides the information if a fiber break is present or not. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* needs to be set to 0.

Example 1:

1; 1010; FiberBreak; 0; 0

Assuming a sequence with two settings (1 and 2) and the measurement on setting 1 detects a fiber break but the fiber on setting 2 is ok, a toggling output (between 1 and 0) is provided; always showing the value related to the current measured setting. The output is given on unit ID 1, holding register 1010.

Example 2:

1; 1010; FiberBreak; 2; 3

This exports the value 1 in case of a fiber break in alarm zone 3 of setting 2 into unit ID 1, holding register 1010.

- **FireDetected**

Provides the information if any temperature alarm criteria in any alarm zone is triggered. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. Outputs: 0 if there is no temperature alarm and 1 if there is a temperature alarm. The *Zone nr / Value* represents the fire sorting value. 1 refers to the largest fire. 10 to the 10th largest one. The value is non-latching.

Example:

1; 1010; FireDetected; 1; 1

Returns the value 1 in case of a temperature event (regardless which zone) from setting 1 into unit ID 1, holding register 1010. Zone nr / Value = 1 refers to the largest fire.

- **FireDirection**

Provides the direction in which the fire is moving. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* represents the fire sorting value. 1 refers to the largest fire. 10 to the 10th largest one. Output: 1 if the fire is moving away from the DTS (towards higher distance values), 0 if the fire is stationary and -1 if the fire is moving towards the DTS (towards lower distance values).

Example:

1; 1011; FireDirection; 1; 2

Exports the direction of the second largest fire (*Zone nr / Value* = 2) of the first setting into unit ID 1, holding register 1011.

- **FirePosition**

Provides the location of the center of a detected fire in meters. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* represents the fire sorting value. 1 refers to the largest fire. 10 to the 10th largest one. The output value is non-latching.

Example:

1; 1012; FirePosition; 1; 3

Provides the position of the third largest fire (regardless which zone) of the first setting into unit ID 1, holding register 1012.

- **FireSizeAbsolute**

Provides the size of a fire in meters. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* represents the fire sorting value. 1 refers to the largest fire. 10 to the 10th largest one. The output value is non-latching.

Example:

1; 1013; FireSizeAbsolute; 1; 2

Shows the size of the second largest fire (regardless which zone) of the first sequence entry into unit ID 1, holding register 1013.

- **FireSizeClass**

Provides the fire size class of a fire. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* represents the fire sorting value. 1 refers to the largest fire. 10 to the 10th largest one. The output value is non-latching.

Example:

1; 1014; FireSizeClass; 1; 1

This exports the size class of the largest fire (regardless which zone) of the first setting into unit ID 1, holding register 1014.

- **FireTempMax10, FireTempMax100, FireTempMin10, FireTempMin100**

Exports the maximum or minimum fire temperature multiplied by either 10 or 100. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* represents the fire sorting value. 1 refers to the largest fire. 10 to the 10th largest one. The output value is non-latching.

Examples:

1; 1603; FireTempMax10; 1; 3

This exports the maximum temperature multiplied by 10 of the third largest fire of setting 1 into unit ID 1, holding register 1603.

1; 1604; FireTempMin100; 0; 2

This exports the minimum temperature multiplied by 100 of the second largest fire in each setting (toggling) into unit ID 1, holding register 1604.

- **OpticTemp10**

OpticTemp10 provides an internal DTS board temperature reference. The *Sequence number* and *Zone nr / Value* must be set to 0.

Example:

3; 1; OpticTemp10; 0; 0

This exports the measured temperature of the DTS internal board into register holding 1 of unit ID 3.

- **RefCoilTemp10**

In the DTS reference coils a temperature sensor is included to calibrate the temperature of the reference coils against this sensor. The sensor temperature value can be exported via RefCoilTemp10. The *Sequence number* and *Zone nr / Value* must be set to 0.

Example:

3; 1; RefCoilTemp10; 0; 0

This exports the measured temperature of the reference coil within the DTS into holding register 1 of unit ID 3

- **TempMax10, TempMin10, TempAverage10, TempBMax10, TempBMin10, TempBAverage10**

Exports the maximum, minimum or average temperature for Measurement A or B. The originally measured value is multiplied by a factor of 10 and therefore provides the temperature including the first decimal place as an integer. A value of 422 corresponds to 42.2 °C. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* selects the alarm zone.

Example:

1; 1603; TempAverage10; 1; 3

This exports the average temperature in zone 3 of setting 1 into unit ID 1, holding register 1603.

- **TempMax100, TempMin100, TempAverage100, TempBMax100, TempBMin100, TempBAverage100**

Exports the maximum, minimum or average temperature for Measurement A or B. The originally measured value is multiplied by a factor of 100 and therefore provides the temperature including two decimal places as an integer. A value of 3261 corresponds to 32.61 °C. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. The *Zone nr / Value* selects the alarm zone.

Example:

1; 2008; TempMax100; 2; 9

This exports the maximum temperature in zone 9 of setting 2 into unit ID 1, holding register 2008.

- **TraceValue, TraceLow, TraceHigh**

The *TraceValue* provides the trace index (number of already created traces in the current running measurement) in steps of 256. A trace index of 1 gives the output 256. An index of 3 gives 768. The *Setting number* must be set to 0 as well as the *Zone nr / Value*. When reaching the value 32512, the next incrementation jumps to -32768 from where it counts up in steps of 256 again.

TraceLow and *TraceHigh* provide the trace index in low and high byte. The *TraceLow* increments by 1 every time the trace index increases by 1. Every time *TraceLow* is reaching 255, *TraceHigh* increments by 1 and *TraceLow* starts again at 0. So *TraceLow* is calculated modulo 256. *TraceHigh* reaches 0 again at a trace index of 65536. The *Setting number* must be set to 0 as well as the *Zone nr / Value*.

Example:

2; 5021; TraceLow; 0; 0

This exports the trace index (modulo 256) of the running measurement sequence into unit ID 2, holding register 5021.

- **TraceTemp10, TraceTemp100, TraceBTemp10, TraceBTemp100**

Exports the measured temperature at a single sample point multiplied by either 10 or 100 of Measurement A or B. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the sample point is selected.

Example:

3; 1010; TraceTemp100; 2; 9

This exports the measured temperature at the 9th sample point of setting 2 into unit ID 3, holding register 1010.

- **AlarmGrad1Temp100, AlarmGrad2Temp100, AlarmGrad3Temp100, AlarmBGrad1Temp100, AlarmBGrad2Temp100, AlarmBGrad3Temp100**

Exports configured gradient temperatures in °C for Measurement A or B, multiplied by 100. An output value of 3261 represents 32.61 °C. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the alarm zone is selected.

Example:

1; 10; AlarmBGrad3Temp100; 2; 9

This exports the alarm gradient 3 temperature change of Measurement B in zone 9 of setting 2 into unit ID 1, holding register 10.

- **AlarmGrad1Time, AlarmGrad2Time, AlarmGrad3Time, AlarmBGrad1Time, AlarmBGrad2Time, AlarmBGrad3Time**

Exports alarm gradient times (in seconds) for Measurement A or B. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the alarm zone is selected.

Example:

1; 10; AlarmGrad1Time; 2; 9

This exports the alarm gradient 1 time in zone 9 of setting 2 of Measurement A into unit ID 1, holding register 10.

- **Value**

Constant values can be defined to separate or determine certain regions in the register holdings. The *Setting number* must be set to 0. The *Setting nr / Value* represents the value.

Example:

1; 1000; Value; 0; 1111

Provides the value 1111 in holding register 1000 of unit ID 1.

- **Year, MonthDay, Hour, MinuteSecond**

These commands present the timestamp when the last measurement cycle was completed. MonthDay and MinuteSecond present the value in high and low byte. Examples for all 4 commands is given below. All outputs are provided in UTC. The *Setting number* can be set to 0 (toggling value) or to an active setting number. The *Zone nr / Value* must be set to 0.

Register Type	Correlation	Examples
Year	1 year \triangleq 1	2023 \triangleq 2023
MonthDay	1 month \triangleq 256, 1 day \triangleq 1	March 7 th \triangleq 3*256 + 7*1 = 775 1293 \triangleq 1293/256 = 5 remainder 13 \triangleq May 13 th
Hour	1 hour \triangleq 1	12:xx \triangleq 12, 00:xx \triangleq 0
MinuteSecond	1 min \triangleq 256; 1 sec \triangleq 1	20 min and 23 sec \triangleq 20*256 + 23*1 = 5143 10777 \triangleq 10777/256 = 42 remainder 25 \triangleq 42 min and 25 sec

Example:

4; 900; MinuteSecond; 4; 0

This provides minutes and seconds of the timestamp of the last trace measured on setting 4 in unit ID 4, holding register 900.

3.2 Multi Sensor Board related Holdings

The MSB related register types are available in the DTS Modbus setup even when the unit is not equipped with a MSB (Options SM0, SRM or SMM). In case the DTS is not equipped with a MSB the register types should not be used. They will anyhow always return the minimum value as output. To use the MSB register types, the DTS firmware version needs to be 5.1.0 or higher. For more details, please refer to the N45 Multi Sensor Board User's Guide.

- **SensAuxCurr100000**

Exports the measured current in Ampere from a current input sensor multiplied by 100000. A value of 216 corresponds to 0.00216 A (2.16 mA).

Example:

1; 10; SensAuxCurr100000; 2; 3

This exports the current of input sensor 3 of setting2 into unit ID 1, holding register 10.

- **SensAuxVolt1000**

Exports the measured voltage in Volt from a voltage input sensor multiplied by 1000, a value of 3998 means 3.998 V.

Example:

1; 10; SensAuxVolt1000; 2; 1

This exports the voltage of input sensor 1 of setting 2 into unit ID 1 in holding register 10.

- **SensRefTemp100**

Exports the measured temperature in °C from a temperature input sensor multiplied by 100; a value of 2393 represents 23.93 °C.

Example:

1; 10; SensRefTemp100; 2; 3

This exports the temperature of temperature input sensor 3 of setting 2 into unit ID 1, holding register 10.

- **SensAuxCurrOutp100000**

Exports the current from a current MSB output multiplied by 100000; a value of 475 represents a current output value of 0.00475 A (4.75 mA). This current output can represent different values, like the average temperature or loss on a specific span.

Example:

1; 10; SensAuxCurrOutp100000; 2; 3

This exports the current of MSB output 3 of setting 2 into unit ID 1, holding register 10.

- **SensRefTempCalOffs100, SensRefTempCalSlope100**

Exports the calibration temperature offset and slope multiplied by 100. A SensRefTempCalOffs100 value of 429 means a calibration temperature offset of 4.29 °C and a SensRefTempCalSlope100 value of 376 means a calibration temperature slope of 3.76.

The Setting number can be set to 0 (toggling value) or to a specific setting number. The Zone nr / Value needs to be set to 0.

Note: The *SensRefTempCalSlope100* value is only available when two calibration reference points are enabled in the MSB tab of the corresponding setting.

Example:

1; 10; SensRefTempCalOffs100; 2; 0

This exports the calibration temperature offset of setting 2 into unit ID 1, holding register 10.

3.3 Register Coils

Go to: Web Browser Interface Main Menu → Modbus → Coils

- **Alarm, AlarmB, AlarmAccu, AlarmBAccu, AlarmAorB, AlarmAorBAccu,**
These alarm commands reflect if there is a temperature alarm event in one specific alarm zone (output value 1 for an alarm, value 0 for no alarm). The values are available for Measurement A or B and also as logical or (disjunction) in the *AorB* containing commands. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the alarm zone number is selected.

Examples:

1; 1010; Alarm; 2; 3

This exports the value 1 in case of a temperature event in alarm zone 3 of setting 2 into unit ID 1, holding register 1010.

1; 2002; AlarmAorB; 2; 5

This exports the value 1 in case of a temperature event in Measurement A or B (or both) in alarm zone 5 of setting 2 into unit ID 1, holding register 2002.

- **PointAlarm, PointAlarmAccu**
These commands show if an alarm is present at a specific sample point. The *Setting number* can be set to 0 (toggling value) or to a specific setting number. In the *Zone nr / Value* the sample point is selected.

Example:

1; 674; PointAlarm; 4;3

This exports the value 1 in case of a temperature event in zone 3 of setting 4 into unit ID 1, holding register 674.

- **SystemStatus**
Indicates if the DTS is connected via LAN or not. In case the DTS is connected, it returns 1. If not connected a 0 is returned. The *Setting number* and *Zone nr / Value* must be set to 0.

Example:

1;4; SystemStatus; 0; 0

This exports the value 1, in case the DTS is connected via LAN into unit ID 1, coil register 4.

- **ConditionErrors**

If the DTS has an internal error status this command exports 1. Otherwise it exports 0. The *Setting number* and *Zone nr / Value* must be set to 0.

Example:

1; 4; ConditionErrors; 0; 0

This shows, in coil register 4 of unit ID 1, if the DTS has an internal error or not.

- **MeasurementRunning**

Exports a value of 0 if the connected DTS is currently not measuring and 1 if there is a measurement running. The *Setting number* and the *Zone nr / Value* must be set to 0.

Example:

1; 6; MeasurementRunning; 0; 0

This exports the value 1, in case a measurement is running, into unit ID 1, coil register 6.

4 Modbus Configuration Testing

To validate the Modbus configuration an appropriate licensed Modbus master simulation software is required. Connect the Modbus master simulation software (e.g. Modbus Poll, see Figure 5) via LAN to the DTS and enter the IP address of the connected DTS LAN port in the connection setup of the Modbus master. The Modbus protocol uses port 502, therefore make sure this port is not blocked by any firewall.

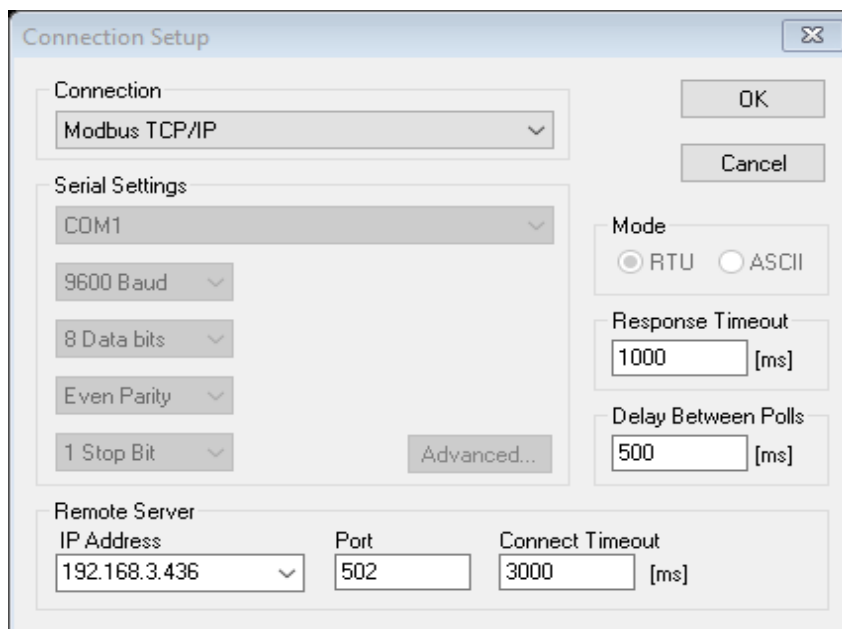


Figure 5 Modbus Poll - Third Party test software

Note: Recommended “Delay Between Polls” setting is ≥ 500 ms.

Note: Maximum 5 parallel IP connections to the DTS are supported. Specific for Modbus requests up to 2 parallel connections are recommended.

5 Holding Specifications

Table 2 lists the value ranges for all available holding register types that can be polled via Modbus TCP from the DTS. The default values will appear in the Modbus master when either no measured trace is available (invalid value = -1), or no alarm or value is available.

Comments on the table values:

- All values containing an *Acc* suffix (stands for accumulated) are latching to hold the value until it is reset. It is important to note, that the toggling *Acc* values (Setting number = 0) are freezing on the current measured setting value when the measurement is stopped.
- The wording “0 / Setting nr” in the *Setting number* column describes that either a global toggling readout is available or a setting related one.
- The value *X* stands for 1,2 or 3 and represents the gradient numbering in the alarm setup of a zone. For example, the first Gradient temperature alarm value on Measurement A is provided by AlarmGrad1Temp100, where *X* is replaced by 1.
- The value *B* is optional and refers to Measurement B related outputs. Register types without a *B* refer to Measurement A related or other outputs.

Register Type	Minimum value	Default (no alarm / w/o measured trace)	Maximum value	Dimension	Setting number	Zone nr / Value
AlarmB / AlarmAorB	0	0	1	1	0 / Setting nr	Zone nr
AlarmBAccu / AlarmAorBAccu	0	0	1	1	0 / Setting nr	Zone nr
AlarmBGradXTemp100 ^{as}	-27315	-27315	32767	°C*100	0 / Setting nr	Zone nr
AlarmBGradXTime ^{as}	1	X=1: 40; X=2: 120; X=3: 360	1200	sec	0 / Setting nr	Zone nr
BufferStatus	Deprecated (only shown in the drop down menu to be downward compatible)					
FiberBreak	0	0	1	1	0 / Setting nr	0 / Zone nr*
FireDetected	0	0 / -1	1	1	0 / Setting nr	1-10**
FireDirection	-1	0 / -1	1	1	0 / Setting nr	1-10**
FirePosition	0	0	32767	m	0 / Setting nr	1-10**
FireSizeAbsolute	0	0	32767	m	0 / Setting nr	1-10**
FireSizeClass	0	0 / -1	10	1	0 / Setting nr	1-10**
FireTempMax10	-2731	-2731	1200	°C*10	0 / Setting nr	1-10**
FireTempMax100	-27315	-27315	32767	°C*100	0 / Setting nr	1-10**
FireTempMin10	-2731	12000	12000	°C*10	0 / Setting nr	1-10**
FireTempMin100	-27315	32767	32767	°C*100	0 / Setting nr	1-10**
Hour	0	-1 (w/o meas. trace)	23	1	0 / Setting nr	0
LengthOfTrace	0	0	32767	m	0 / Setting nr	0
MinuteSecond	0	-1 (w/o meas. trace)	15163	1	0 / Setting nr	0
MonthDay	0	-1 (w/o meas. trace)	3103	1	0 / Setting nr	0
NumberOfDataPoints	0	0	32767	1	0 / Setting nr	0
OpticTemp10	-2731	12000	12000	°C*10	0	0
PointAlarm	0	0	1	1	0 / Setting nr	Sample Point
PointAlarmAccu	0	0	1	1	0 / Setting nr	Sample Point
RefCoilTemp10	-2731	12000	32767	°C*10	0	0
SensAuxDig	Deprecated (only shown in the drop down menu to be downward compatible, permanent output: -1)					

SensAuxCurr100000	-400	-400	2400	A*100000	0 / Setting nr	1-2 / 1-4***
SensAuxVolt1000	-300	-300	12000	V*1000	0 / Setting nr	1 / 1-2***
SensRefTemp100	-20000	-20000	32767	°C*100	Setting nr	1-4 / 1-8***
SensAuxCurrOutp100000	0	0	2000	A*100000	Setting nr	1-4 / 1-8***
SensRefTempCalOffs100	-20000	-20000	32767	°C*100	0 / Setting nr	0
SensRefTempCalSlope100	-20000	-20000	32767	1*100	0 / Setting nr	0
SystemStatus	0	N/A	1	1	0	0
TempBAverage10 ^{as}	-2731	-2731	12000	°C*10	0 / Setting nr	Zone nr
TempBAverage100 ^{as}	-27315	-27315	32767	°C*100	0 / Setting nr	Zone nr
TempBMax10 ^{as}	-2731	-2731	12000	°C*10	0 / Setting nr	Zone nr
TempBMax100 ^{as}	-27315	-27315	32767	°C*100	0 / Setting nr	Zone nr
TempBMin10 ^{as}	-2731	12000	12000	°C*10	0 / Setting nr	Zone nr
TempBMin100 ^{as}	-27315	32767	32767	°C*100	0 / Setting nr	Zone nr
TraceHigh	0	0	255	1	0	0
TraceLow	0	0	255	1	0	0
TraceTempB10	-2731	-2731	12000	°C*10	0 / Setting nr	Sample Point
TraceTempB100	-27315	-27315	32767	°C*100	0 / Setting nr	Sample Point
TraceValue	-32768	-32768	32767	1	0	0
Value	-32768	N/A	32767	1	0	Integer
Year	2016	-1 (w/o meas. trace)	32767	1	0 / Setting nr	0

* Setting Number = 0 and Zone nr / value = 0 is not configurable.

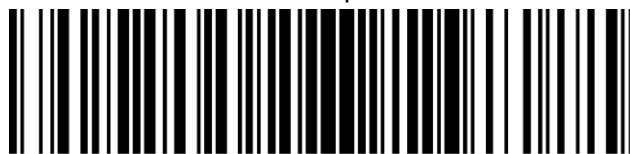
** Fire sorting value: 1 means the largest fire, 10 the smallest of the first 10 largest ranked fires.

*** XXX / YYY: XXX represents the range which is available if only one MSB is equipped. YYY represents the range when two MSBs are equipped.

^{as} These values need a corresponding active alarm criteria in the associated zones, otherwise they are not provided. For example: TempMax100 requires an active maximum alarm criteria.

Table 2 Modbus Holding Specifications

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