Connection

First make a connection and make sure that the correct connection mode (Modbus TCP), IP and port is set. I've left the other parameters at default.

Modbus Poll - Mbpoll1 File Edit Connection Setup Functions Display View Window Help D C	₹ \ ?		 - 0 ×
Mbpoll1 Tx = 0; Err = 0; ID = 1; F = 03; SR = 1000ms No connection Name 00000 0	Connection Setup		
1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0	Connection Modbus TCP/IP Serial Settings CCM1 G600 Baud G00 Baud Even Parity I Stop Bit Advanced	OK Cancel Mode @RTU ASCII Response Timeout 1000 [ms] Delay Between Pols 20 [ms]	
	Renote Modbus Server IP Address or Node Name [122_165.58]* Server Port: Connect Timeout: @ IPv4 502 000 [md] O IPv6		

Read out channel 1 (outlet 1) from outputActualVoltage

We need to check this register in the SPDM model:

	output_incusures		output curcurrent		-		.			
4324	output_measures	omvoac	outputActualVoltage	fd	2	27	54	•	ro	ALL
										DATABUG IDABI

It is a fd with 2 bytes. Now we look up the correct Modbus Type by using the SPDM type from the SPDM model in the table of our Modbus specification.

SPDM Type	Modbus Type	Details
int, 1	1 register, integer	
int, 2	1 register, integer	
int, 3	2 consecutive registers, 32 bit integer*	Both registers must be accessed together.
int, 4	2 consecutive registers, 32 bit integer*	Both registers must be accessed together.
fd, 2	2 consecutive registers, 32 bit float*	Both registers must be accessed together.
ascii, even sized	(size/2) registers, string*	All registers must be accessed together.

Each data type in SPDM is mapped to Modbus as in the following table.

So to get the value for a (fd, 2) channel we need to read 2 consecutive registers in Modbus and interpret it as a 32bit float. It will result in the following settings in Modbus Poll. Mind that the Slave ID needs to be set to the unit address of the PDU. Set View to 'fit to quantity' and press OK.

鶴 Modbus Poll - Mbpoll2 Ella Edit Connections Satura Europiana Disalay, View, Wieday, Hala	- 0 ×
D 📽 🖬 🏐 🗙 🗂 🗒 👜 ⊥ 05 06 15 16 17 22 23 TC 🖻 📓 🎗	K5
Mbpoll2 Tx = 39: Err = 0: ID = 191: F = 03: SR = 1000ms 4324 4324 4325 17251	Read/Write Definition Sieve ID: ID:

There are now two values in the two that are read correctly, but they are not interpreted yet. As the table in our Modbus specification states, it should be interpreted as a 32bit Float. If we set the format to Little-endian byte swap we find the correct value.

() Mbpoll2 Tx = 222: Err = 0: ID = 191: F = 03	: SR = 1000ms							
Name 04324 4324 225,54 4325	Format Read/write Definition Cut Copy Paste Select All	F8 Ctrl+X Ctrl+C Ctrl+V Ctrl+A	Signed Unsigned Hex ASCII - Hex Binary 32-bit Signed 32-bit Unsigned	Alt+Shift+S Alt+Shift+U Alt+Shift+H Alt+Shift+A > >				
	Font Scaling	Alt+Shift+C Alt+Shift+F Ctrl+Shift+S	64-bit Signed 64-bit Unsigned	64-bit Signed 64-bit Unsigned	64-bit Signed 64-bit Unsigned	>	Big-endian	
	Link to Chart	>	64-bit Double	>	Little-endian			
					Big-endian byte swap Little-endian byte swap			

- If you want to read out channel 2; as the first register at 4324 took two consecutive registers, channel two will be available at 4326 (because it uses 2 bytes per channel) and will again take two consecutive registers to read and so on.

Read out channel 1 (outlet 1) from outputkWhTotal

Connect to the PDU with Modbus as in the previous example. Let's lookup outputkWhTotal in the SPDM model.

4000 output_measures omkwht outputkWhTotal int 3 27 81 · ro ALL

It is an int with 3 bytes as we can see. Now we go to our Modbus specification:

SPDM Type	Modbus Type	Details
int, 1	1 register, integer	
int, 2	1 register, integer	
int, 3	2 consecutive registers, 32 bit integer*	Both registers must be accessed together.
int, 4	2 consecutive registers, 32 bit integer*	Both registers must be accessed together.
fd, 2	2 consecutive registers, 32 bit float*	Both registers must be accessed together.
ascii, even sized	(size/2) registers, string*	All registers must be accessed together.

Each data type in SPDM is mapped to Modbus as in the following table.

So as it is defined in the SPDM model as an (int,3) we need to read it as 2 consecutive registers that need to be interpreted as an 32 bit integer.

	Read/Write Definition X	
Modbus Poll - Mbpoll1 File Edit Connection Setup Functions Display Vie Image:	Slave ID: 191 OK	
Mbpoll1 Tx = 172: Err = 0: ID = 191: F = 03: SR = 1000m	Address mode O Read Holding Registers (+x) Cancel	
Name 04000 4000 37831	Address: 4000 PLC address = 44001 Quantity: 2 Scan Rate: 1000	ŀ
	Disable Read/Write Disabled Disable on error Read/Write Once View Rows 10 20 50 100 Fit to Quantity Hide Name Columns PLC Addresses (Base 1) Address in Cell Enron/Daniel Mode	
For Help, press F1.	Request RTU BF 03 0F A0 00 02 DC 23 ASCII 3A 42 46 30 33 30 46 41 30 30 30 30 32 38 44 0D 0A	[1

We read the value of channel one using the settings above.

Modbus Poll - Mbpoll1

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📴 Mbpoll1	🖫 Mbpoll1 🕞 🗖 💌						
Tx = 21: Err = 0: ID = 191: F = 03: S	R = 1000ms						
Name 04000 4000 -27705							
4001	Format	>	\checkmark	Signed	Alt+Shift+S		
	Read/write Definition	F8		Unsigned	Alt+Shift+U		
	Cut Copy	Ctrl+X Ctrl+C		ASCII - Hex Binany	Alt+Shift+A		
	Paste Select All	Ctrl+V Ctrl+A		32-bit Signed	>		
	Colors	Alt+Shift+C		32-bit Unsigned 64-bit Signed	>	Big-endian Little-endian	
	Scaling	Ctrl+Shift+S		64-bit Unsigned	>	Big-endian byte swap	
	Link to Chart	>		32-bit Float	>	Little-endian byte swap	
	Link to chart	,		64-bit Double	>		

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We interpret the value as stated in the Modbus specification and get the correct value for this PDU. It took 2 consecutive registers to read channel 1 at 4000, but watch out, channel 2 will be at 4003 (because it uses 3 bytes per channel) but will take again 2 consecutive registers to read as stated by the Modbus specification.

	Name	04000
4000		37831
4001		

Extended registers

As stated in the Modbus specification and the SPDM model, a register can be of type extended. A measurement for the first 27 outlets starts at 4000 for example, but the registers of the second half of outlets (27) are available starting at 14000. Only outlets that are actually on the PDU will have measurements of course.

- Take a look at the corresponding Excel file, here you can see the range of Modbus registers for the extended 27 registers. Channel 28 can be reached at starting register + 10000 and so on when the channels are read individually.