SONORODE GENERATOR

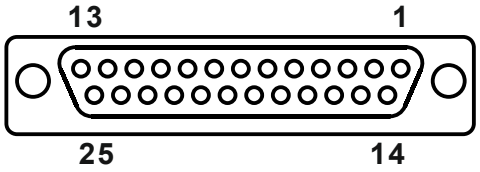
Protocol Description
RS485 ModBus RTU

CONTENTS

The generator supports standard RS485 ModBus RTU protocol. RS485 Bus is available by 25-pin DSUB I/O socket on the back side panel and through RJ45 connector on the front panel of the generator.

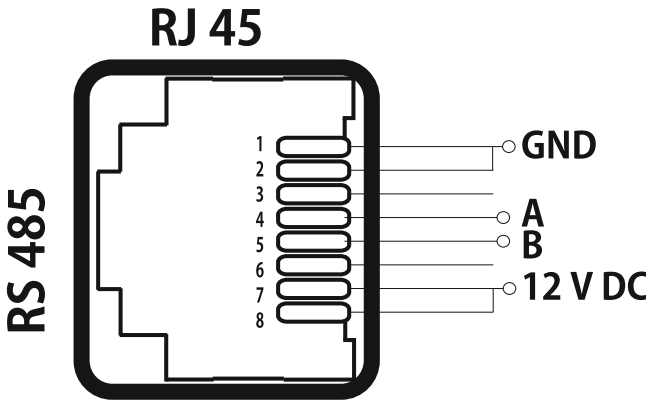
25-pin DSUB I/O socket

Assignment of the 25-pin DSUB interface socket



PIN NO. ON DSUB SOCKET INTERFACE X1	SIGNAL NAME	DESCRIPTION
1	**+12 VOLT OUT**	12 Volt for external use
2	**POUT**	Output 0 – 10 Volt = Power output 0 – 100 %
3	**P-EXT.-IN**	Analog Input 0 – 10 Volt for power control
4	**GND**	Shared reference point = Ground
5/9	**HF-DA-ERROR**	Optrone root (shared) for “HF-DA” and “ERROR”
6	**HF-DA**	Output “HF-DA”
7	**ERROR**	Output “ERROR”
8	**A**	A signal of RS 485 interface
9/5	**HF-DA-ERROR**	Optrone root (shared) for “HF-DA” and “ERROR”
10	**B**	B signal of RS 485 interface
11	**<> Nominal**	Output for nominal value
12	**FAN-ON**	Monitoring output = 12 Volt when the fan is running
13	**FS-24 V**	Remote control input (with 12 – 24 Volt)
14	**GND**	Shared reference point = Ground
15	**GND**	Shared reference point = Ground
16	**N/C**	Spare
17	**FAN-ON**	Monitoring output = 12 Volt when the fan is running
18	**N/C**	Spare
19	**N/C**	Spare
20		Reserved for internal use only
21		Reserved for internal use only
22		Reserved for internal use only
23		Reserved for internal use only
24		Reserved for internal use only
25		Reserved for internal use only

Interface socket RS485 ModBus - RJ 45 CONNECTOR:



PINS	DESCRIPTION
1	GND
2	GND
3	N/C
4	A
5	B
6	N/C
7	12 V DC
8	12 V DC

Bus Description

- bus address of the device (1 - 255) –selecting via LCD panel
- transmission speed – selecting via LCD panel
- No parity check
- The number of Data-Bits is RTU 8 Data-Bits
- The number of STOP-Bits is 1 STOP-Bit

Important remarks for operation in the Master/Slave-System:
!! The bus address must be differently adjusted for each device
!! Transmission mode, baud rate and parity must be identical

All data in a MODBUS-Slave are allocated to addresses. Data access (read or write) is made by the corresponding control command and the indication of the corresponding data address.
In general, a MODBUS telegram starts with the address of the slave, followed by a control command (e.g. read register) and the data. By means of the checksum at the telegram end, the bus participants can recognize transmission errors.

The following MODBUS – control commands are supported:

Description	**Function code**
Read Registers	0x03
Write Registers	0x10

Example:
Read Registers 3 (0x03)
Query

Field Name	Example
Slave Address	0x11
Function	0x03
Starting Address Hi	0x00
Starting Address Lo	0x6B
No. of Points Hi	0x00
No. of Points Lo	0x03
Error Check (CRC)	—

Response

Field Name	Example
Slave Address	0x11
Function	0x03
Byte Count	0x06
Data Hi	0x02
Data Lo	0x2B
Data Hi	0x00
Data Lo	0x00
Data Hi	0x00
Data Lo	0x64
Error Check (CRC)	—

Write Registers 16 (0x10)
Query

Field Name	Example
Slave Address	0x11
Function	0x10
Starting Address Hi	0x00

Starting Address Lo	0x01
No. of Registers Hi	0x00
No. of Registers Lo	0x02
Byte Count	0x04
Data Hi	0x00
Data Lo	0x0A
Data Hi	0x01
Data Lo	0x02
Error Check (CRC)	—

Response

Field Name	Example
Slave Address	11
Function	10
Starting Address Hi	00
Starting Address Lo	01
No. of Registers Hi	00
No. of Registers Lo	02
Error Check (CRC)	—

CRC Generation

A procedure for generating a CRC is:

1, Load a 16–bit register with FFFF hex (all 1's). Call this the CRC register.
2. Exclusive OR the first 8–bit byte of the message with the low–order byte of the 16–bit CRC register, putting the result in the CRC register.
3. Shift the CRC register one bit to the right (toward the LSB), zero–filling the MSB. Extract and examine the LSB.
4. (If the LSB was 0): Repeat Step 3 (another shift).
(If the LSB was 1): Exclusive OR the CRC register with the polynomial value A001 hex (1010 0000 0000 0001).
5. Repeat Steps 3 and 4 until 8 shifts have been performed. When this is done, a complete 8–bit byte will have been processed
When the 16–bit CRC (two 8–bit bytes) is transmitted in the message, the low-order byte will be transmitted first, followed by the high-order byte.

Registers Definition

MODBUS RS485 RTU no parity, 8 bit data, 1 stop bit						
register#	**address**	**action**	**parameter**	**dim/resolution**	**type**	**format**
0	0x0000	R	BEAT counter	cnt	unsigned INT	
1	0x0001	R/W	Start frequency set point	0,01 kHz	fixed point	XX.XX kHz
2	0x0002	R/W	Output power set point	W	unsigned INT	
3	0x0003	R/W	Span set point	ru	unsigned INT	
4	0x0004	R/W	AM freq max	Hz	unsigned INT	
5	0x0005	R/W	Regulator Ki set point	ru	unsigned INT	
6	0x0006	R/W	Regulator Kv set point	ru	unsigned INT	
7	0x0007	R/W	I max set point	mA	unsigned INT	

8	0x0008	R/W	Modbus address	adr	unsigned BYTE	1 - 255
9	0x0009	R/W	Command word	bit field	unsigned BYTE	bit 0 - spare
						bit 1 - START
						bit 2 - STOP
						bit 3 - SCAN
						bit 4 - WRITE
						bit 5 - spare
10	0x000A	R	Status	ASCII code	unsigned BYTE	0x30 stop
						0x31 start
						0x32 overcurrent
						0x33 over voltage
						0x34 overheat
						0x35 Load error
						0x36 No load
						0x37 Frequency error
						0x38 Resonance error
						0x39 Phase protection
11	0x000B	R	Analog set point	W	unsigned INT	
12	0x000C	R	Output Current	mA	unsigned INT	
13	0x000D	R	Output voltage	V	unsigned INT	
14	0x000E	R	Output PWM	0,001	fixed point	XXX.X %
15	0x000F	R	Output power	W	unsigned INT	
16	0x0010	R	Frequency shift	0,01 kHz	unsigned INT	
17	0x0011	R	Frequency actual	0,01 kHz	fixed point	XX.XX kHz
18	0x0012	R	Frequency shift	0,01 kHz	fixed point	XX.XX kHz
19	0x0013	R/W	Sonicator time ON	s	unsigned INT	
20	0x0014	R/W	Sonicator time	min	unsigned INT	
21	0x0015	R/W	Sonicator time OFF	s	unsigned INT	
22	0x0016	R/W	Sonicator energy	kj	unsigned INT	
23	0x0017	R/W	Modbus speed	code	unsigned INT	0-19200b
						1-38400b
						2-115200b
24	0x0018	R/W	Minimal power	W	unsigned INT	
25	0x0019	R/W	Amplitude set point	V	unsigned INT	
26	0x001A	R/W	Current scale	ru	unsigned INT	
27	0x001B	R	External temperature	0,1 °C	fixed point	XX.X °C
28	0x001C	R	Current energy	kj	unsigned INT	
29	0x001D	R	Current time	s	unsigned INT	
30	0x001E	R/W	Spare	ru	unsigned INT	
31	0x001F	R/W	Phase	ru	unsigned INT	
32	0x0020	R/W	Phase filtered	ru	unsigned INT	
33	0x0021	R/W	Phase protection SP	ru	unsigned INT	
34	0x0022	R/W	Phase filter depth	ru	unsigned INT	
35	0x0023	R/W	Time to write osci	s	unsigned INT	

36	0x0024	R/W	Spare			
37	0x0025	R/W	Start up speed	ru		1 slow ..... 50 fast
38	0x0026	R/W	Start up phase	ru	unsigned INT	
39	0x0027	R/W	AM modulation depth	%	unsigned INT	
40	0x0028	R/W	AM freq min	Hz	unsigned INT	
41	0x0029	R/W	AM sweep speed	ru	unsigned INT	1----20
42	0x002A	R/W	Sweep type	code	unsigned INT	0-off 1 -AMMM 2-periodic
43	0x002B	R/W	Sweep depth	Hz	unsigned INT	
44	0x002C	R/W	Sweep frequency	Hz	unsigned INT	
45	0x002D	R/W	Smoothing	ru	unsigned INT	
46	0x002E	R/W	AM on	code	fixed point	0-off 1-on
……						
100 - 291	0x0064 - 0x0123	R	Scanning DATA			
300-899	0x012c-0x0383	R	Osci data			
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