Sauer Compressors

MODBUS RTU

Sauer-Compressors
Type: Sauer ecc 4.0

Dependable up to 500 bar – anywhere, anytime, anygas.

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1 General

1.1 Copyright

1.2 Sauer-Service

Contact

Postal address:	**J.P. SAUER & SOHN Maschinenbau GmbH Sauer-Service Brauner Berg 15 24159 Kiel, Germany**
Telephone (international)	
Technical information:	+49 431 39 40 -87
Spare parts orders:	+49 431 39 40 -86/886
Telefax (international):	+49 431 39 40 -89
Emergency service 24/7 (international):	+49 172 4 14 63 94
E-mail:	*service@sauercompressors.de*
Web:	*www.sauercompressors.com*

2 Operating conditions

*Data can only be written to **configuration registers** when the compressor is stopped. If data is written to a register of this type during operation, an error (0x04) is reported.*

*Data can be written to the registers for **starting** and **stopping** the compressor at any time.*

Definition of Modbus

Modbus RTU (Remote Terminal Unit) is a protocol for transmitting data between a master and one or more slaves over a serial interface.

Sauer ecc 4.0 software version

To use the Modbus protocol, software version 02.05 or higher is required.

Installation

The PC or the operator control system is always the master, which means that the Sauer ecc 4.0 can be queried from there.

Interface

RS-485 interface 1 is used here ↳ Compressor control wiring diagram.

Configuration

Parity, stop bit, baud rate and address for the RS485 interface can be configured in the compressor control ↳ Sauer-ECC 4.0 operating instructions. The baud rates available are 4800, 9600, 19200, 38400, 115200 and 230400. Bus addresses can have the values 1–12.

3 Modbus register tables

Hexadecimal notation

Addresses in the tables are shown in hexadecimal notation, e.g. ***Address 1006*** *(system pressure) corresponds to* ***4102*** *in decimal notation. Register values are generally subject to a scaling and unit specified in the table, e.g. a value of 5000 for system pressure means 50 bar.*

Tab. 1: Standard register

Address	Meaning	Set	Get	Register length	Data type	Scaling	Unit
1000	Compressor status	-	✓	1	↳ *Tab. 5 'Compressor status' on page 14*		
1001	Reserved	-	✓	1	-	-	-
1002	Feed pressure	-	✓	2	i32	0.01	bar
1004	Suction pressure	-	✓	2	i32	0.01	bar
1006	System pressure	-	✓	1	u16	0.01	bar
1007	Stage 1 pressure	-	✓	1	u16	0.01	bar
1008	Stage 2 pressure	-	✓	1	u16	0.01	bar
1009	Stage 3 pressure	-	✓	1	u16	0.01	bar
100A	Stage 4 pressure	-	✓	1	u16	0.01	bar
100B	Stage 5 pressure	-	✓	1	u16	0.01	bar
100C	Stage 6 pressure	-	✓	1	u16	0.01	bar
100D	Oil pressure	-	✓	1	u16	0.01	bar
100E	Oil level	-	✓	1	u16	0.01	L
100F	Reserved	-	✓	1	-	-	-
1010	Cooling water inlet pressure	-	✓	1	u16	0.01	bar

1011	Cooling water outlet pressure	-	✓	1	u16	0.01	bar
1012	Cooling water differential pressure	-	✓	1	u16	0.01	bar
1013	Reserved	-	✓	2	-	-	-
1015	Motor current	-	✓	1	u16	0.01	A

Tab. 2: Temperatures

Address	Meaning	Set	Get	Register length	Data type	Scaling	Unit
2000	Reserved	-	✓	1	-	-	-
2001	Gas outlet temperature	-	✓	1	i16	0.01	°C
2002	Oil temperature	-	✓	1	i16	0.01	°C
2003	Cooling water inlet temperature	-	✓	1	i16	0.01	°C
2004	Cooling water outlet temperature	-	✓	1	i16	0.01	°C
2005	Reserved	-	✓	5	-	-	-
200A	Stage 1.1 temperature before cooler	-	✓	1	i16	0.01	°C
200B	Stage 1.1 temperature after cooler	-	✓	1	i16	0.01	°C
200C	Stage 1.2 temperature before cooler	-	✓	1	i16	0.01	°C
200D	Stage 1.2 temperature after cooler	-	✓	1	i16	0.01	°C
200E	Stage 1.3 temperature before cooler	-	✓	1	i16	0.01	°C

200F	Stage 1.3 temperature after cooler	-	✓	1	i16	0.01	°C
2010	Stage 1.4 temperature before cooler	-	✓	1	i16	0.01	°C
2011	Stage 1.4 temperature after cooler	-	✓	1	i16	0.01	°C
2012	Stage 1.5 temperature before cooler	-	✓	1	i16	0.01	°C
2013	Stage 1.5 temperature after cooler	-	✓	1	i16	0.01	°C
2014	Stage 2.1 temperature before cooler	-	✓	1	i16	0.01	°C
2015	Stage 2.1 temperature after cooler	-	✓	1	i16	0.01	°C
2016	Stage 2.2 temperature before cooler	-	✓	1	i16	0.01	°C
2017	Stage 2.2 temperature after cooler	-	✓	1	i16	0.01	°C
2018	Stage 2.3 temperature before cooler	-	✓	1	i16	0.01	°C
2019	Stage 2.3 temperature after cooler	-	✓	1	i16	0.01	°C
201A	Stage 3.1 temperature before cooler	-	✓	1	i16	0.01	°C
201B	Stage 3.1 temperature after cooler	-	✓	1	i16	0.01	°C
201C	Stage 3.2 temperature before cooler	-	✓	1	i16	0.01	°C

201D	Stage 3.2 temperature after cooler	-	✓	1	i16	0.01	°C
201E	Stage 4 temperature before cooler	-	✓	1	i16	0.01	°C
201F	Stage 4 temperature after cooler	-	✓	1	i16	0.01	°C
2020	Stage 5 temperature before cooler	-	✓	1	i16	0.01	°C
2021	Stage 5 temperature after cooler	-	✓	1	i16	0.01	°C
2022	Stage 6 temperature before cooler	-	✓	1	i16	0.01	°C
2023	Stage 6 temperature after cooler	-	✓	1	i16	0.01	°C

Tab. 3: Information

Address	Meaning	Set	Get	Register length	Data type	Scaling	Unit
3000	Compressor type	-	✓	1	u8	-	-
3001	Serial number (control)	-	✓	6	text	-	-
3007	Software version	-	✓	10	text	-	-
3011	Serial number	-	✓	10	text	-	-
301B	Hardware version	-	✓	6	text	-	-
3021	Maintenance interval	-	✓	2	u32	-	-

3023	Remaining time until service	-	✓	2	i32	1	h
3025	Operating hours	-	✓	2	u32	1	h

Tab. 4: Operating parameters

Address	Meaning	Set	Get	Register length	Data type	Scaling	Unit
4000	Feed pressure start pressure	✓	✓	2	i32	0.01	bar
4002	Feed pressure stop pressure	✓	✓	2	i32	0.01	bar
4004	System pressure start pressure	✓	✓	1	u16	0.01	bar
4005	System pressure stop pressure	✓	✓	1	u16	0.01	bar
4006	Operating mode	-	✓	1	*Tab. 6 'Operating mode' on page 14*		
4007	Remote mode	-	✓	1	bool	-	-
4008	Time Hour	-	✓	1	u8	-	-
4009	Time Minute	-	✓	1	u8	-	-
400A	Date Day	-	✓	1	u8	-	-
400B	Date Month	-	✓	1	u8	-	-

400C	Date Year	-	✓	1	u16	-	-
400D	Start	✓	-	1	-	-	-
400E	Stop	✓	-	1	-	-	-

Tab. 5: Compressor status

Register value [decimal]	Meaning
0	Error
1	Initialisation
2	Start inhibit
3	Ready to start
4	Operation inhibit
5	Standby
6	Start unload time
7	Starting
8	Load inhibit time
9	Under load
10	Reload delay
11	Offload
12	Stopped
13	Drainage

Tab. 6: Operating mode

Register value [decimal]	Meaning
0	Manual
1	Automatic

Tab. 7: Alarms (0000-00013)

Address	Bit	Meaning
0000	0	Stage 1 pressure too high
0000	2	Stage 2 pressure too high
0000	4	Stage 3 pressure too high
0000	6	Stage 4 pressure too high
0000	8	Stage 5 pressure too high
0000	10	Stage 6 pressure too high
0000	12	System pressure too high

0000	15	Oil pressure low
0001	0	Oil pressure high
0001	2	Feed pressure low
0001	5	Suction pressure low
0001	6	Suction pressure high
0001	8	Cooling water inlet pressure low
0001	9	Cooling water inlet pressure high
0001	11	Cooling water outlet pressure low
0001	12	Cooling water outlet pressure high
0001	14	Cooling water DIFF pressure low
0001	15	Temp. before cooler at stage 1.1 too high
0002	1	Temp. after cooler at stage 1.1 too high
0002	3	Temp. before cooler at stage 1.2 too high
0002	5	Temp. after cooler at stage 1.2 too high
0002	7	Temp. before cooler at stage 1.3 too high
0002	9	Temp. after cooler at stage 1.3 too high
0002	11	Temp. before cooler at stage 1.4 too high
0002	13	Temp. after cooler at stage 1.4 too high
0002	15	Temp. before cooler at stage 1.5 too high
0003	1	Temp. after cooler at stage 1.5 too high
0003	3	Temp. before cooler at stage 2.1 too high
0003	5	Temp. after cooler at stage 2.1 too high
0003	7	Temp. before cooler at stage 2.2 too high
0003	9	Temp. after cooler at stage 2.2 too high
0003	11	Temp. before cooler at stage 2.3 too high

0003	13	Temp. after cooler at stage 2.3 too high
0003	15	Temp. before cooler at stage 3.1 too high
0004	1	Temp. after cooler at stage 3.1 too high
0004	3	Temp. before cooler at stage 3.2 too high
0004	5	Temp. after cooler at stage 3.2 too high
0004	7	Temp. before cooler at stage 4 too high
0004	9	Temp. after cooler at stage 4 too high
0004	11	Temp. before cooler at stage 5 too high
0004	13	Temp. after cooler at stage 5 too high
0004	15	Temp. before cooler at stage 6 too high
0005	1	Temp. after cooler at stage 6 too high
0005	3	Gas outlet temperature too high
0005	7	Oil temperature low
0005	8	Oil temperature high
0005	10	Feed pressure temperature low
0005	11	Feed pressure temperature high
0005	13	Cooling water inlet temperature low
0005	14	Cooling water inlet temperature high
0006	0	Cooling water outlet temperature low
0006	1	Cooling water outlet temperature high
0006	3	Oil level low
0006	4	Oil level high
0006	15	Dew point
0007	0	Overcurrent shutdown
0007	1	Overcurrent shutdown
0007	2	Electric motor connection
0007	3	Phase failure

0007	4	Phase failure L1
0007	5	Phase failure L2
0007	6	Phase failure L3
0007	7	Phase unbalance
0007	8	Emergency stop
0007	11	Pre-filter differential pressure
0007	12	After-filter 1 differential pressure
0007	13	After-filter 2 differential pressure
0007	14	Oil pressure low
0007	15	Oil level low
0008	6	Drainage system max. fill level
0008	7	Dew point
0008	8	Dryer error
0008	9	Thermistor protection
0008	10	Thermistor protection phase 1
0008	11	Thermistor protection phase 2
0008	12	Thermistor protection phase 3
0008	13	Door contact switch activated
0008	14	Motor overload
0008	15	SD card missing
0009	0	Config file missing
0009	5	Maintenance is due
0009	6	Power failure
0009	7	Queue overflow
000A	1	Lead/Lag compressor 01
000A	2	Lead/Lag compressor 02
000A	3	Lead/Lag compressor 03
000A	4	Lead/Lag compressor 04
000A	5	Lead/Lag compressor 05
000A	6	Lead/Lag compressor 06
000A	7	Lead/Lag compressor 07
000A	8	Lead/Lag compressor 08
000A	9	Lead/Lag compressor 09
000A	10	Lead/Lag compressor 10

000A	11	Lead/Lag compressor 11
000A	12	Lead/Lag compressor 12

Tab. 8: Errors (0014-00027)

Address	Bit	Meaning
0014	0	Stage 1 pressure too high
0014	1	Stage 1 pressure sensor error
0014	2	Stage 2 pressure too high
0014	3	Stage 2 pressure sensor error
0014	4	Stage 3 pressure too high
0014	5	Stage 3 pressure sensor error
0014	6	Stage 4 pressure too high
0014	7	Stage 4 pressure sensor error
0014	8	Stage 5 pressure too high
0014	9	Stage 5 pressure sensor error
0014	10	Stage 6 pressure too high
0014	11	Stage 6 pressure sensor error
0014	12	System pressure too high
0014	13	Safety valve pressure reached
0014	14	System pressure sensor error
0014	15	Oil pressure low
0015	0	Oil pressure high
0015	1	Oil pressure sensor error
0015	2	Feed pressure low
0015	4	Feed pressure sensor error
0015	5	Suction pressure low
0015	6	Suction pressure high
0015	7	Suction pressure sensor error
0015	8	Cooling water inlet pressure low
0015	9	Cooling water inlet pressure high
0015	10	Cooling water inlet pressure sensor error
0015	11	Cooling water outlet pressure low
0015	12	Cooling water outlet pressure high
0015	13	Cooling water outlet pressure sensor error

0015	14	Cooling water DIFF pressure low
0015	15	Temp. before cooler at stage 1.1 too high
0016	0	Temp. before cooler at stage 1.1 sensor error
0016	1	Temp. after cooler at stage 1.1 too high
0016	2	Temp. after cooler at stage 1.1 sensor error
0016	3	Temp. before cooler at stage 1.2 too high
0016	4	Temp. before cooler at stage 1.2 sensor error
0016	5	Temp. after cooler at stage 1.2 too high
0016	6	Temp. after cooler at stage 1.2 sensor error
0016	7	Temp. before cooler at stage 1.3 too high
0016	8	Temp. before cooler at stage 1.3 sensor error
0016	9	Temp. after cooler at stage 1.3 too high
0016	10	Temp. after cooler at stage 1.3 sensor error
0016	11	Temp. before cooler at stage 1.4 too high
0016	12	Temp. before cooler at stage 1.4 sensor error
0016	13	Temp. after cooler at stage 1.4 too high
0016	14	Temp. after cooler at stage 1.4 sensor error
0016	15	Temp. before cooler at stage 1.5 too high
0017	0	Temp. before cooler at stage 1.5 sensor error
0017	1	Temp. after cooler at stage 1.5 too high
0017	2	Temp. after cooler at stage 1.5 sensor error
0017	3	Temp. before cooler at stage 2.1 too high
0017	4	Temp. before cooler at stage 2.1 sensor error

0017	5	Temp. after cooler at stage 2.1 too high
0017	6	Temp. after cooler at stage 2.1 sensor error
0017	7	Temp. before cooler at stage 2.2 too high
0017	8	Temp. before cooler at stage 2.2 sensor error
0017	9	Temp. after cooler at stage 2.2 too high
0017	10	Temp. after cooler at stage 2.2 sensor error
0017	11	Temp. before cooler at stage 2.3 too high
0017	12	Temp. before cooler at stage 2.3 sensor error
0017	13	Temp. after cooler at stage 2.3 too high
0017	14	Temp. after cooler at stage 2.3 sensor error
0017	15	Temp. before cooler at stage 3.1 too high
0018	0	Temp. before cooler at stage 3.1 sensor error
0018	1	Temp. after cooler at stage 3.1 too high
0018	2	Temp. after cooler at stage 3.1 sensor error
0018	3	Temp. before cooler at stage 3.2 too high
0018	4	Temp. before cooler at stage 3.2 sensor error
0018	5	Temp. after cooler at stage 3.2 too high
0018	6	Temp. after cooler at stage 3.2 sensor error
0018	7	Temp. before cooler at stage 4 too high
0018	8	Temp. before cooler at stage 4 sensor error
0018	9	Temp. after cooler at stage 4 too high
0018	10	Temp. after cooler at stage 4 sensor error

0018	11	Temp. before cooler at stage 5 too high
0018	12	Temp. before cooler at stage 5 sensor error
0018	13	Temp. after cooler at stage 5 too high
0018	14	Temp. after cooler at stage 5 sensor error
0018	15	Temp. before cooler at stage 6 too high
0019	0	Temp. before cooler at stage 6 sensor error
0019	1	Temp. after cooler at stage 6 too high
0019	2	Temp. after cooler at stage 6 sensor error
0019	3	Gas outlet temperature too high
0019	5	Gas outlet temperature sensor error
0019	7	Oil temperature low
0019	8	Oil temperature high
0019	9	Oil temperature sensor error
0019	10	Feed pressure temperature low
0019	11	Feed pressure temperature high
0019	12	Feed pressure temperature sensor error
0019	13	Cooling water inlet temperature low
0019	14	Cooling water inlet temperature high
0019	15	Cooling water inlet temperature sensor error
001A	0	Cooling water outlet temperature low
001A	1	Cooling water outlet temperature high
001A	2	Cooling water outlet temperature sensor error
001A	3	Oil level low
001A	4	Oil level high
001A	5	Oil level sensor error
001A	15	Dew point

001B	0	Overcurrent shutdown
001B	1	Overcurrent shutdown
001B	2	Electric motor connection
001B	3	Phase failure
001B	4	Phase failure L1
001B	5	Phase failure L2
001B	6	Phase failure L3
001B	7	Phase unbalance
001B	8	Emergency stop
001B	11	Pre-filter differential pressure
001B	12	After-filter 1 differential pressure
001B	13	After-filter 2 differential pressure
001B	14	Oil pressure low
001B	15	Oil level low
001C	6	Drainage system max. fill level
001C	7	Dew point
001C	8	Dryer error
001C	9	Thermistor protection
001C	10	Thermistor protection phase 1
001C	11	Thermistor protection phase 2
001C	12	Thermistor protection phase 3
001C	13	Door contact switch activated
001C	14	Motor overload
001C	15	SD card missing
001D	0	Config file missing
001D	8	CanBus network failure
001D	9	CanBus Node Error

Tab. 9: Status (0028-0003b)

Address	Bit	Meaning
0028	12	Stop pressure reached
0028	20	Feed pressure low
002A	20	Operating temperature low
002A	22	Oil temperature low

002D	26	Max. motor starts per 10 minutes reached
002D	27	Max. motor starts per 60 minutes reached

Tab. 10: Data types

Type	Description	Value range
i8	8-bit integer with sign	-128 - 127
u8	8-bit integer without sign	0 - 255
i16	16-bit integer with sign	-32768 - 32767
u16	16-bit integer without sign	0 - 65535
i32	32-bit integer with sign	-2147483648 - 2147483647
u32	32-bit integer without sign	0 - 4294967295
bool	Boolean	True (1) or False (0)