

Dear customer,

The Honeywell-Elster Volume Conversion Devices (VC) type EK205, EK220, EK260 and EK280 support data communication via Modbus. The Modbus protocol is open to transfer almost any value, it offers very individual configuration options. For a successful commissioning, the configuration must be defined in advance. This document should help you to gather the necessary parameters so that they are clarified and available at the time of commissioning.

Please clarify the below described parameters with the end user.

Please note that the clarification of these parameters cannot be made shortly, during commissioning.

Our experience shows that the definition of the required parameters, especially when using such a technique for the first time, raises some questions among the users.

Honeywell offers you a support in the form of a small project, in which we clarify all the necessary issues. If all parameters are available, we may create a corresponding parameter file. This can be loaded into the device via the optical interface via enSuite and OPTO head. Thus, a commissioning on site can be done quickly and smoothly.

On request, commissioning on site can also be done by our service. The billing of the use is done according to our service conditions for service technicians on site.

It is strongly recommended that an end user of the later system operator (Modbus programmer) is available during commissioning. This allows fine-tuning of the Modbus settings and final acceptance by retrieving the data.

For more information or if you would like to accept our support offer, in the form of a small project, please contact your local sales representative or our electronics support via email to elstersupport@honeywell.com

Station

| Station Information | |
|--------------------------------------|----------------------|
| Plant operator (Company) | <input type="text"/> |
| Name of measuring point | <input type="text"/> |
| Street / City | <input type="text"/> |
| Country | <input type="text"/> |
| Local contact person (Name, Surname) | <input type="text"/> |
| Tel. No. (Mobile) | <input type="text"/> |

Contact person:

| Name | Owner of the device | Modbus User |
|------------------|------------------------|------------------------|
| Name, Surname | <input type="text"/> | <input type="text"/> |
| Company | <input type="text"/> | <input type="text"/> |
| Street | <input type="text"/> | <input type="text"/> |
| City Code / City | <input type="text"/> | <input type="text"/> |
| Country | <input type="text"/> | <input type="text"/> |
| Telephone No. | <input type="text"/> | <input type="text"/> |
| Mobile No. | <input type="text"/> | <input type="text"/> |
| E-mail Address | <input type="text"/> | <input type="text"/> |
| | @ <input type="text"/> | @ <input type="text"/> |

Used Volume Conversion Device (if known)

| Device | | | |
|------------------|---|------------------|----------------------|
| Type | <input type="radio"/> EK205 <input type="radio"/> EK260 <input type="radio"/> EK280 <input type="radio"/> DL230 | | |
| Serial No. EK2xx | <input type="text"/> | Software-Version | <input type="text"/> |
| Serial No. FE260 | <input type="text"/> | | |

Hardware Connection

1. Direct connection via RS-232 (RxD / TxD / GND)
2. Connection via RS-485 – 2 wires interface (Data+ / Data-)
3. Connection via RS-422 – 4 wire interface (T+/T-/R+/R-)

| Interface | Factory setting | Customized value |
|--|--|------------------------|
| Interface type | <input type="radio"/> RS-232 (RxD / TxD / GND) <input type="radio"/> RS-485 – 2w (Data + / Data -) <input type="radio"/> RS-422 – 4w (T+ / T- / R+ / R-) | |
| RS-485-2w Bus mode | <input type="radio"/> yes; No. of slave devices: <input type="text"/> <input type="radio"/> no | |
| Polling cycle between two requests to one slave in a bus system | Consider polling cycle \geq 2 seconds | |
| Waiting time between switching from slave “a” to “b” in a bus system | Consider waiting time \geq 5 seconds | |
| Baud rate (300 – 19200 Bd) | 9600 Bd | <input type="text"/> |
| Data format (7e1, 8n1) | Auto (8n1) | <input type="text"/> |
| Cable length Master/Slave in meter | <input type="text"/> | <input type="text"/> m |
| Installation of the EK2xx in: | <input type="radio"/> Ex Zone 1 <input type="radio"/> Ex Zone 2 <input type="radio"/> No Ex area | |
| Used RS-422/485 repeater: In bus mode, galvanic isolation is strictly recommended for each EK2xx! | <input type="radio"/> “Advantech ADAM-4510S” (recommended) <input type="radio"/> Other: <input type="text"/> | |

Modbus Setting

| Parameter | Factory setting | Customized value |
|------------------------------|---|---|
| Modbus Transmission mode | <input type="radio"/> RTU | <input type="radio"/> ASCII |
| Slave address (ID; 1...247) | 1 | <input type="text"/> |
| Data order (L-word / H-word) | <input type="radio"/> L-word first (1234) | <input type="radio"/> H-word first (4321) |
| Data order (L-byte / H-byte) | „High Byte first“ (fixed) | |
| Register size (16 / 32 Bit) | <input type="radio"/> 16 Bit | <input type="radio"/> 32 Bit |
| Address mode (Log./Phys.) *1 | <input type="radio"/> Logical | <input type="radio"/> Physical |

*1: If the logical address mode is used (factory setting of the EK2xx) please subtract “1” to get the right value (e.g. for the pressure ask for address 336_{Dec} (=150_{Hex}) in logical mode)!

Modbus Map

Up to 70 parameters can be used for the Modbus map. Below you'll find the factory setting. For the first test, we recommend to use this map. Later, a customized Modbus map is easily programmable via enSuite.

| | |
|--|--|
| Modbus Map | |
| Use of the standard Modbus Map (see below) ? | <input type="radio"/> yes <input type="radio"/> no |

Factory setting:

| No. | Register Address | Data type | No. of. Reg. | Designation / value | LIS200 address |
|-----|------------------|------------|--------------|----------------------------------|----------------|
| 1 | 1 | UShort | 1 | Remaining battery life | 2:404 |
| 2 | 2 | UShort | 1 | Momentary status total | 1:100 |
| 3 | 3 | UShort | 1 | Vm total, fractional digits | 4:302_2 |
| 4 | 4 | UShort | 1 | Vb total, fractional digits | 2:302_2 |
| 5 | 5 | UShort | 1 | W total, fractional digits | 1:302_2 |
| 6 | 101 | ULong | 2 | Vm total, pre-decimal position | 4:302_1 |
| 7 | 103 | ULong | 2 | Vb total, pre-decimal position | 2:302_1 |
| 8 | 105 | ULong | 2 | W total, pre-decimal position | 1:302_1 |
| 9 | 301 | IEEERFloat | 2 | Pressure at base conditions | 7:312_1 |
| 10 | 303 | IEEERFloat | 2 | Temperature at base conditions | 6:312_1 |
| 11 | 305 | IEEERFloat | 2 | Measured absolute pressure value | 6:210_1 |
| 12 | 307 | IEEERFloat | 2 | Measured pressure value | 6:211_1 |
| 13 | 309 | IEEERFloat | 2 | Measured temperature value | 5:210_1 |
| 14 | 311 | IEEERFloat | 2 | Conversion factor | 5:310 |
| 15 | 313 | IEEERFloat | 2 | Compressibility | 8:310 |
| 16 | 315 | IEEERFloat | 2 | Substitute pressure value | 7:311_1 |

Elster EK2x0 – Modbus (RS-232/485/422) – V6

Requirements for a Successful Commissioning



| No. | Register Address | Data type | No. of. Reg. | Designation / value | LIS200 address |
|-----|------------------|-------------|--------------|------------------------------------|----------------|
| 17 | 317 | IEEEFloat | 2 | Substitute temperature value in °C | 6:311_1 |
| 18 | 319 | IEEEFloat | 2 | Nitrogen content | 14:314 |
| 19 | 321 | IEEEFloat | 2 | Hydrogen content | 12:314 |
| 20 | 323 | IEEEFloat | 2 | Carbon dioxide content | 11:314 |
| 21 | 325 | IEEEFloat | 2 | Standard gas density | 13:314_1 |
| 22 | 327 | IEEEFloat | 2 | Operational load | 4:310 |
| 23 | 329 | IEEEFloat | 2 | Standard load | 2:310 |
| 24 | 331 | IEEEFloat | 2 | Power | 1:310 |
| 25 | 333 | IEEEFloat | 2 | Calorific value | 10:314_1 |
| 26 | 335 | IEEEFloat | 2 | Relative density | 15:314 |
| 27 | 337 | IEEEFloat | 2 | Used pressure for conversion (bar) | 7:310_1 |
| 28 | 339 | IEEEFloat | 2 | Used temperature for convers. (°C) | 6:310_1 |
| 29 | 501 | Zaehler6 | 3 | Vm total | 4:302 |
| 30 | 504 | Zaehler6 | 3 | Vb total | 2:302 |
| 31 | 507 | Zaehler6 | 3 | W total | 1:302 |
| 32 | 801 | Array8, BCD | 4 | Vm total | 4:302 |
| 33 | 805 | Array8, BCD | 4 | Vb total | 2:302 |
| 34 | 809 | Array8, BCD | 4 | W total | 1:302 |
| 35 | 813 | Array8, BCD | 4 | Date and time | 1:400 |
| 36 | 817 | Array6, BCD | 3 | Device number (serial number) | 1:180 |
| 37 | 820 | Array2, BCD | 1 | Day boundary | 2:141_1 |

Own list / supplement to the default list:

| No. | Register Address | Data type | No. of. Reg. | Designation / value | LIS200 address |
|-----|------------------|-----------|--------------|---------------------|----------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |

| No. | Register Address | Data type | No. of. Reg. | Designation / value | LIS200 address |
|-----|------------------|-----------|--------------|---------------------|----------------|
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |
| 17 | | | | | |
| 18 | | | | | |
| 19 | | | | | |
| 20 | | | | | |
| 21 | | | | | |
| 22 | | | | | |
| 23 | | | | | |
| 24 | | | | | |
| 25 | | | | | |

...

Important notes:



The basic setup of the EK2xx should be strictly done by the parameterisation software enSuite to take care about all internal communication values (timings etc.). The enSuite can be downloaded free-of charge from the Elster website (<https://www.elster-instromet.com/en/ensuite>). The necessary optical head (conform to the international standard IEC62056:21) is also available by Elster (order No.: 04115530).



The configuration of the Modbus map can only be done via enSuite.



For connection of the EK2xx via 2 or 4 wires to a bus system (RS-485, RS-422) the use of an external repeater for the galvanic isolation and for the adjustment of the signals (electrical levels) to the bus system strictly recommended.

For a recommendation: we have made good experience with the ADAM-4510S from the company Advantech (www.advantech.com).


This repeater is also available by Elster (Order. No.: 041 15 603)





By installation of the EK2xx in Ex zone 1 (and maybe also in Ex zone 2) there must be an Ex barrier like the FE260 be used. If you use your own Ex barrier, please check the relevant Ex parameter of the User manual of the EK2xx.





To transmit any data via Modbus there must be one lock opened. We recommend leaving the customer lock or the data supplier lock opened (Factory setting of this locks = "0").


 If you want to change some parameter via Modbus, the responsible lock must be opened! The used key of the used lock and also the status of the lock itself (for closing the lock later on) must be included in the Modbus map.

 One connection (call acceptance window) for the used interface must be opened to get answers from the EK2xx via Modbus.


 For a cyclic data communication (e.g. every hour or faster !) an external power supply is strictly recommended, to take care about the service lifetime of the device battery. For EK280 there is an internal power supply module 230VAC available for use in Ex zone 2.

 **Since the devices have an internal operating cycle of 2 seconds, a query every second does not make sense. If there are several "partial" queries from the same slave (different Modbus registers), a waiting time of at least 2 seconds should therefore be observed.**

 **In bus mode (e.g. via RS-485 - 2w) a waiting time of more than 5 seconds must be observed when switching from Modbus slave "a" to slave "b" so that the EK2xx can distinguish a new request in bus system.**

 Please take also care about the notes in the user manual and of the application manual of the EK2xx. This can be downloaded via the Elster "Docuthek":
(<http://docuthek.kromschroeder.com/documents/index.php>).

There are many notes regarding Modbus communication included.

 On request, there is an additional Modbus Compendium for all members of the EK2x0 family available. Sent an e-mail to elstersupport@honeywell.com.