MODBUS GATEWAY
TECHNICAL DATA

Utilising a bus system and a central computer for the central evaluation and processing of measured data is advisable whenever a complex system has to be controlled, such as a system with many measuring stations or where the measuring points are remote within buildings and large underground car parks.

Traditionally, gas measuring systems, which determine the concentration of gases and vapours in ambient air, output their measured values in analogue form (4-20mA). Although such a system can be connected to digital data communication, this is complicated and expensive.

Euro-Gas offers a simple and low cost modbus gateway that converts the analogue 4-20mA measured signals to digital form before transmitting the signals serially via an RS485 interface to a central computer, which may be as far away as 1000m.

The gateway uses the proven modbus protocol, a widely used, clearly structured, stable and reliable protocol. The individual modbus gateways are attached one after another to the data line and they only transmit their data on request of the central computer (so called master-slave architecture). A maximum of four measuring systems can be connected to each modbus coupler via four channels. The digital signal contains the following information: identifier of the coupler, channel, measured gas and measured value.

Implementation and maintenance of the modbus system is very stable, in addition to being simple and inexpensive. Modbus is widely used and the user will find many compatible computers. A programmable logic controller (PLC) is available on request.

DESIGN OF THE MODBUS GATEWAY

The modbus gateway is mounted in an aluminium housing. The cables are led in through cable glands (PG11).

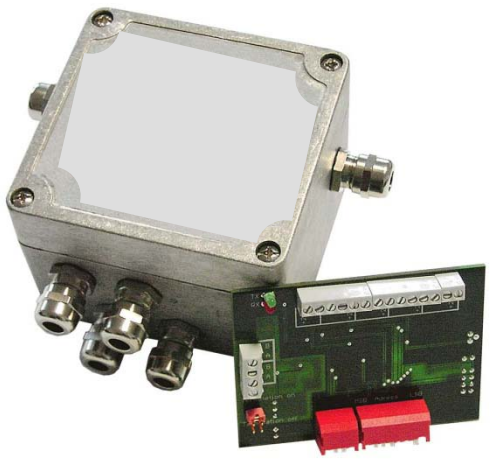

Fig. 1: Modbus gateway

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Gateway		
Power supply	Current	Screw terminals About 100mA; without measuring systems!
	Voltage	+24Vdc ±5%
Ambient temperature	-10°C to +50°C	
Air pressure	900 hPa to 1100hPa	
Permissible humidity	15-95% rel. humidity	No moisture condensation
Housing	Aluminium	Grey
Type of protection housing	IP 54	
Weight of housing	About 500g	
Size of housing	Approx. L90xB85xW65 mm	
Display elements in housing	Green LED Rx ON	Read data
	Red LED Tx On	Write data
Operating elements in housing	Address switch	Set address
	Function switch	Baud rate
	Termination	Terminating resistor ON/OFF
Connections – measuring systems		
Measuring system S1	KL 0 V (out)	O V, supply voltage S1
	KL 24 V (out)	+24 V, supply voltage S1
	KL S1 (in)	4-20 mA from S1
Measuring system S2	KL 0 V (out)	O V, supply voltage S2
	KL 24 V (out)	+24 V, supply voltage S2
	KL S2 (in)	4-20 mA from S2

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Connections – measuring systems		
Measuring system S3	KL 0 V (out)	O V, supply voltage S3
	KL 24 V (out)	+24 V, supply voltage S3
	KL S3 (in)	4-20 mA from S3
Measuring system S4	KL 0 V (out)	0 V, supply voltage S4
	KL 24 V (out)	+24 V, supply voltage S4
	KL S4 (in)	4-20 mA from S4
Power supply	KL 0 V (in)	0 V
	KL 24 V (in)	+24 V
Connections – bus		
Data output	KL B	Data line
	KL A	Data line
	KL SGND	Functional ground
Data input	KL B	Data line
	KL A	Data line
	KL SGND	Functional ground

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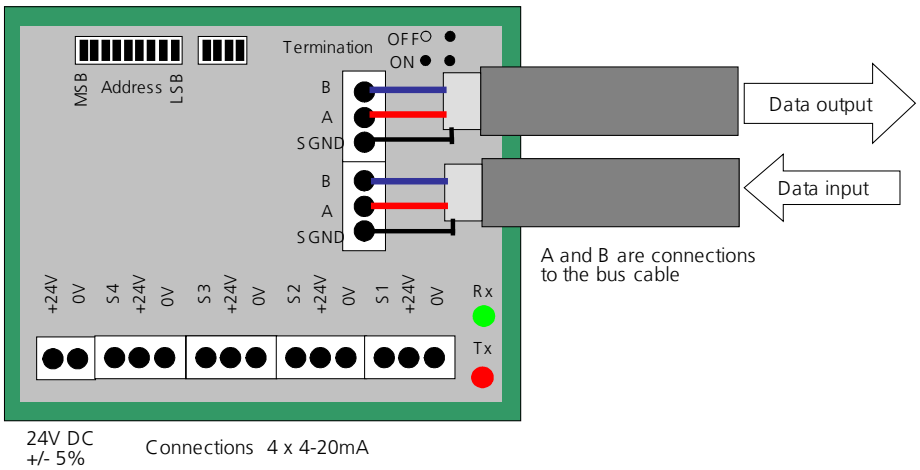
CONNECTION OF THE MODBUS GATEWAY



DIP SWITCH:
PRINCIPLE OF OPERATION CONCERNING BAUD RATE

Switch position	ON	Switch up
	OFF	Switch down
Parity	2 OFF	parity odd
	2 ON	no parity
Baud rate	3 OFF + 4 OFF	2.400 Bit/sec
	3 ON + 4 OFF	9.600 Bit/sec
	3 OFF + 4 ON	14.400 Bit/sec
	3 ON + 4 ON	19.200 Bit/sec

OTHER

When installing, mounting and operating the modbus gateway, please be sure to observe all relevant regulations in the country of installation.

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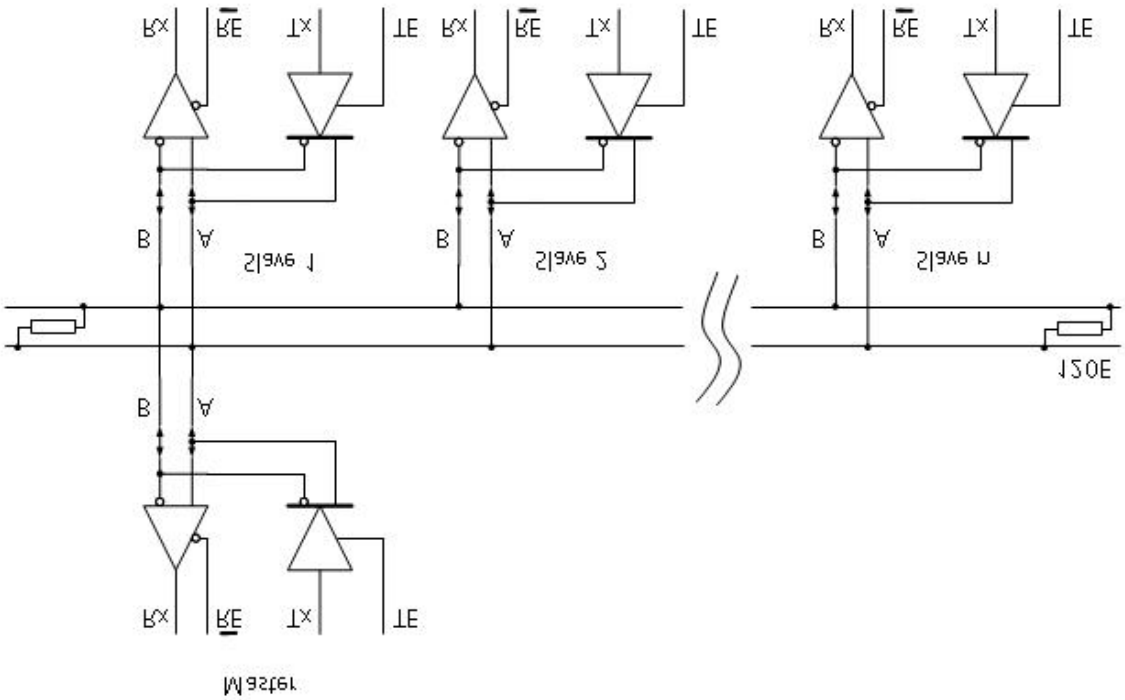
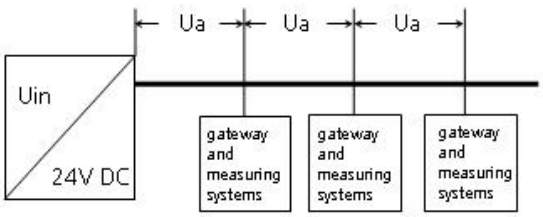
ANNEX - Schematic design



Schematic design of an RS485 driver. TE and RE are the enable lines for the transmitter and receiver. Tx is the data output from the central computer (controller). Rx is the data input to the controller. A and B are the connections to the bus.

Loss of voltage (DC)



$$Ua = \frac{2*L*I}{æ*A}$$

L = line length in meter
Ua = line voltage drop in V
æ = kappa Cu =56
A = line diameter in mm²
I = current in A

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