

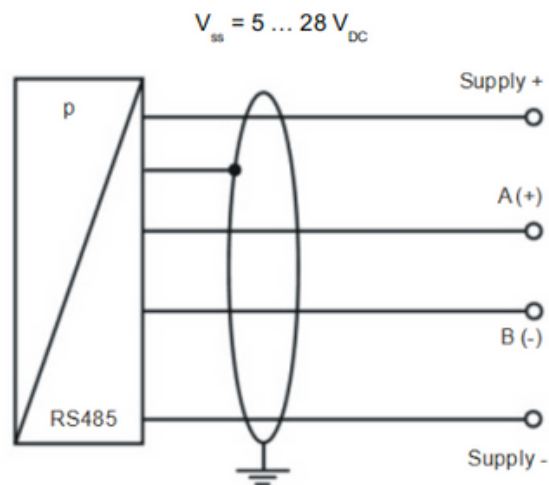
RS485 MODBUS RTU- Protocol description

GENERAL

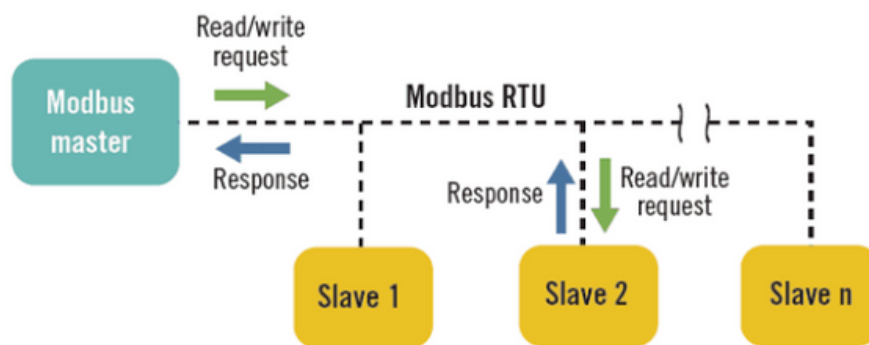
The PMP-C200-MOD Pressure Transmitter uses the Modbus RTU (Remote Terminal Unit) communication protocol, which has found its way into industrial communication as an open protocol. The Modbus protocol is based on a master-slave architecture in which up to 255 slaves can be queried by a master.

CIRCUIT DIAGRAM

RS485 / MODBUS RTU



BUS-SETUP / TOPOLOGY OF MODBUS RTU



MODBUS RTU COMMUNICATION

CONFIGURATION OF MODBUS RTU

After a startup (coldstart) of 500ms the transducer is ready for work (measure) and answer on requests.

Default settings	1	2	0
address	1 ... 255		
baudrate			
2400		0	
4800		1	
9600		2	
19200		3	
38400		4	
56000		5	
57600		6	
115200		7	
protocol			
8N1			0

DESCRIPTION OF REGISTERS

Holding Register (x03 – READ HOLDING REGISTER)		
address	register	data type
x0000	pressure H [digit]	Float - IEEE754
x0001	pressure L [digit]	Float - IEEE754
x0002	pressure H [<i>pressure unit</i>]	Float - IEEE754
x0003	pressure L [<i>pressure unit</i>]	Float - IEEE754
x0004	---	
x0005	---	
x0006	---	
x0007	---	
x0008	temperature H [°C]	Float - IEEE754
x0009	temperature L [°C]	Float - IEEE754
x000A	measurement range H [<i>pressure unit</i>]	Float - IEEE754
x000B	measurement range L [<i>pressure unit</i>]	Float - IEEE754
x000C	measurement range H [digit]	Float - IEEE754
x000D	measurement range L [digit]	Float - IEEE754
x000E	gradient H [<i>pressure unit</i>]	Float - IEEE754
x000F	gradient L [<i>pressure unit</i>]	Float - IEEE754

The order of the transmitted float numbers is D-C-B-A (HIGH ... LOW).

Input Register (x04 – READ INPUT REGISTER)		
address	register	data type
x0000	pressure normalized (p_korr1)	UInt16
x0001	temperature normalized (tmpnorm)	UInt16
x0002	measure range min (mbmin) [pressure unit]	UInt16
x0003	measure range max (mbmax) [pressure unit]	UInt16
x0004	exponent [H], pressure unit [L]	UInt16
x0005	software version sensor	UInt16
x0006	revision software	UInt16
x0007	serial number H	UInt16
x0008	serial number M	UInt16
x0009	serial number L	UInt16
x000A	serial number X	UInt16
x000B	software version Modbus	UInt16

pressure unit (address x0004)			
Code [UInt16]	pressure unit	Code [UInt16]	pressure unit
xyy00	atm	xyy0A	kPa
xyy01	bar	xyy0B	lb/ft2
xyy02	cmH2O @4°C	xyy0C	mH2O @4°C
xyy03	cmHG @0°C	xyy0D	mHG @0°C
xyy04	ftH2O @4°C	xyy0E	MPa
xyy05	hPa	xyy0F	Pa
xyy06	inH2O @4°C	xyy10	psi
xyy07	inHG @0°C	xyy11	torr
xyy08	kg/cm2	xyy12	mbar
xyy09	kg/m2		
xyy0A	hPa		

Single Register (x06 – WRITE SINGLE REGISTER)		
address	register	data type
x0000	Modbus device address (1...255)	UInt16
x0001	baudrate (see table baudrate 0 ... 7)	UInt16
x0002	Set ZERO (= 4711 _{dez} / 1267 _{hex})	UInt16
x0003	Save DATA (= 9029 _{dez} / 2345 _{hex})	UInt16

baudrate	
Code [UInt16]	baudrate [Bd]
x0000	2.400
x0001	4.800
x0002	9.600
x0003	19.200
x0004	38.400
x0005	56.000
x0006	57.600
x0007	115.200

Notice! In the present firmware there is no response to the command x06! To save settings like transmitter MODBUS address and baud rate permanently, the "Save DATA" command must be executed.

EXAMPLES FOR COMMUNICATION

x03 READ holding register * complete *	Request (Master → Transducer) 05 03 00 00 00 12 C4 43	Structure of this request 05 MODBUS-Slave address (8Bit) 03 READ holding register (8Bit) 00 00 Start address x0000 (High - Low) 00 12 Number of WORDs read (12 _n = 18 _d) C4 43 Checksum (WORD CRC16)
	answer (Transducer → Master) 05 03 24 C4 84 A0 00 C0 48 51 1A 00 00 00 00 00 00 00 C1 16 00 00 00 00 00	Structure of this answer 05 MODBUS-Slave address (8Bit) 03 holding register as answer (8Bit)

	41 EC 00 00 46 1C 40 00 3B 41 54 CA 0E F9	24 number of data (bytes) w/o checksum <u>data</u> C4 84 A0 00 C0 48 51 1A 00 00 00 00 00 00 00 00 C1 16 00 00 00 00 00 00 41 EC 00 00 46 1C 40 00 3B 41 54 CA 0E F9 checksum (WORD CRC16)
x03 READ holding register * only pressure *	Request (Master → Transducer) 05 03 00 02 00 02 64 4F	Structure of this request 05 MODBUS-Slave address (8Bit) 03 READ holding register (8Bit) 00 02 Start address x0002 00 02 Number of WORDs read ($2_h = 2_d$) 64 4F checksum (WORD CRC16)
	answer (Transducer → Master) 05 03 04 C0 53 14 13 3D 2F	Structure of this answer 05 MODBUS-Slave address (8Bit) 03 holding register as answer (8Bit) 04 number of data (bytes) w/o checksum <u>data</u> C0 53 14 13 At READ holding register x03 the transferred data must convert on IEEE754-standard into the float- value of pressure: = -3,298 [pressure unit] 3D 2F checksum (WORD CRC16)

RTU- PROTOCOL RESTRICTIONS

The RTU protocol uses binary coding of data and a 16-bit CRC check to detect transmission errors. The message frame is limited by an interval of at least 3.5 character transmission times before and after the message is transmitted. When using the RTU protocol, it is very important that messages are sent as continuous characters (stream without gaps). If a gap of more than 3.5 characters occurs in the message during reception, a slave device interprets this as the end of the frame and discards the received bytes.

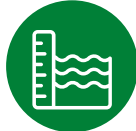
RTU messaging is stateless. It is not necessary to open or close connections to a specific slave. A transmission error is indicated when no response is received from the slave. In case of a transmission error, a master simply repeats the message. In case of an error, the message is discarded without sending a response to the master.

PRIGNITZ

MIKROSYSTEMTECHNIK



PRESSURE



LEVEL



TEMPERATURE



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