

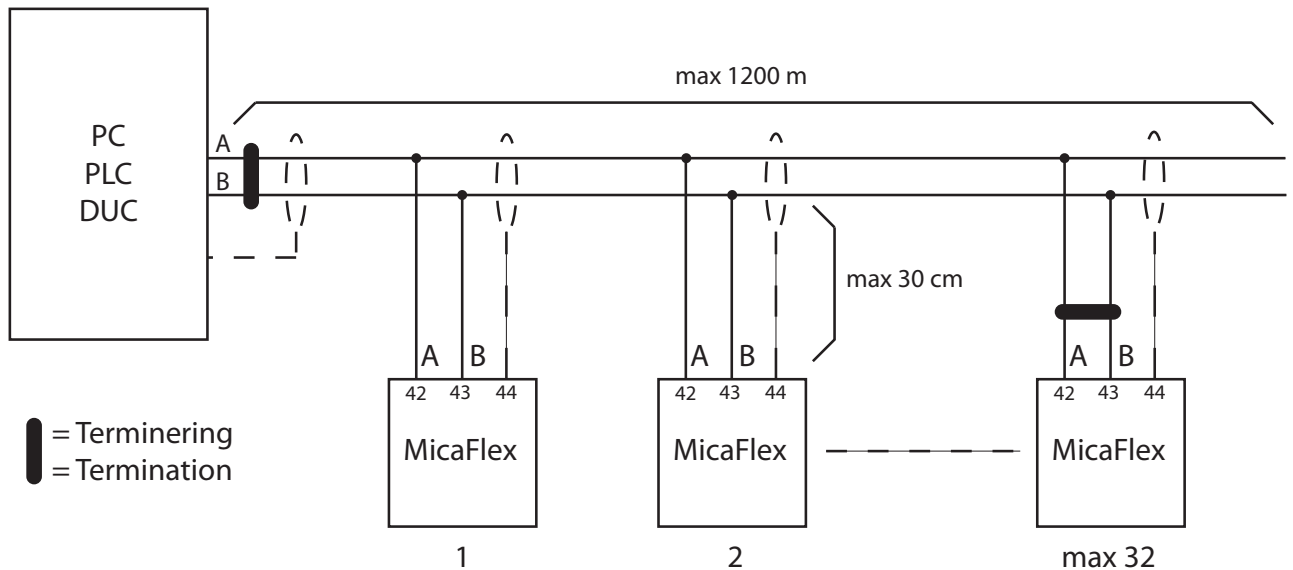
### Modbus RTU Data communication module with RS-485 interface

### Modbus-RTU MF-PFA

#### Electrical connection

The communication module for Modbus RTU uses RS-485 as interface and has 4 terminals:

- 41 Signal zero (normally not used)
- 42 A (T+/R+)
- 43 B (T-/R-)
- 44 Shield



RS-485 must be terminated in each end of the bus and it is done by setting the miniature switches on DIL1 in position 'ON'. The termination is done to prevent signal reflections in the wire and at the same time set the bus (RS-485) to a preset passive signal level. This minimize the risc of signal and communication distortion. According to standard the twisted-paired wires are namned with A and B. An older name for A is T+ and for B the older name is T-. When connecting, lead 'A' should be connected to 'A' and lead 'B' connected to 'B'.

#### Common guidelines:

- The used cable should be of twisted-pair type.
- Bus-net must be used as topology, NOT any star-net. Max distance between the bus and each unit is 30 cm.
- Each end of the bus must be terminated.
- Max length of the bus is approximately 1200 meter, depending on cable quality.
- Max number of connected units to the bus is 32 pcs.

## Configuration

Parameters for Modbus RTU are located in the parameter group **Communication**.

Lead text	Min	Max	Default
Address	1	247	21
Baud	OFF 600 1200 2400 4800 7200 9600 14400 19200 38400 57600 115200 128000		38400
Parity	NONE ODD EVEN		NONE
Protect	NO YES		NO

- *Address* is the units unique id on the bus. Using several units on the same bus requires that each unit has its own unique id.
- *Baud* is the transfer rate. It is very important that all units are configured with the same rate in Baud.
- *Parity* is the selected parity for data communication. All units on the same bus must use the same parity to communicate. If 'NONE' is selected, two stop bits are automatically added. If 'ODD' or 'EVEN' parity is used, one stop bit is automatically added.
- *Protect* is used to protect the configuration and settings to be altered through remote access. 'YES' will result in read-only mode, i.e. parameters and values can only be read on the remote terminal. 'NO' will result in read and write permissions on the remotely accessed unit, i.e. parameters can be read and changed. It is for example possible to set a different set point value through the Modbus RTU.

### Reading values from the parameter list

Reading of parameter list is done with the function 03 in Modbus RTU, "Read Holding Registers". Parameter P00 is read from register 40001, P01 is read from register 40002 etc. Since all communication use only integer values, parameter values that use decimal value must be scaled to the correct decimal value in the receiving unit. E.g. if the set point value has two decimals and the communication reads the integer value 286, the received value must be scaled to 2.86 after reading.

### Writing values to the parameter list

Writing to parameter list is done with the function 06 in Modbus RTU, "Preset Single Register" alternatively function 16, "Preset Multiple Registers". Parameter P00 uses register 40001, P01 uses register 40002 etc. Since all communication use only integer values, parameter values that use decimal value must be scaled to the correct decimal value in the receiving unit. E.g. if the set point value has two decimals and should be programmed to 5.23 l/s, the integer value 523 is written to the data address for the set point value.

### Reading current values

Reading of current values is done with the function 04 in Modbus RTU, "Read Input Registers". Current value I00 is read from register 30001, I01 is read from register 30002 etc. Since all communication use only integer values, current values that use decimal value must be scaled to the correct decimal value in the receiving unit. E.g. if the flow has one decimal and the communication read the integer value 183, the value must be scaled to 18.3 after reading.

## Micaflex-PFA: [Applies to SW: I/O 3.60 and higher] Parameters

Register	No	Lead text	Min	Max	Decimals
<b>Internals</b>					
40001	P00	SW: I/O	0,00	99,99	2
40002	P01	SW: OPI	0,00	99,99	2
40003	P02	<i>Not used</i>			
<b>System settings</b>					
40004	P03	Display	0 = dP 1 = FLOW 2 = dP+FLOW 3 = SRC+CTRL	Only pressure Only flow Pressure and flow Output signal PI-controller	
40005	P04	Damping [s]	0,0	9,9	1
40006	P05	Access code	0000	9999	0
40007	P06	Number of OPI	1	3	0
40008	P07	<i>Not used</i>			
<b>Output 1</b>					
40009	P08	Source	0 = dP 1 = FLOW 2 = CTRL	Pressure Flow Output signal PI-controller	
40010	P09	Signal V	0 = 0..10 1 = 2..10	0..10 Volt 2..10 Volt	
40011	P10	Signal mA	0 = 0..20 1 = 4..20	0..20 mA 4..20 mA	
<b>Output 2</b>					
40012	P11	Source	0 = dP 1 = FLOW 2 = CTRL	Pressure Flow Output signal PI-controller	
40013	P12	Signal V	0 = 0..10 1 = 2..10	0..10 Volt 2..10 Volt	
40014	P13	Signal mA	0 = 0..20 1 = 4..20	0..20 mA 4..20 mA	
<b>Pressure</b>					
40015	P14	<i>Not used</i>			
40016 *	P15	MinCal[Pa]	-32768	32767	0
40017 *	P16	MaxCal[Pa]	-32768	32767	0
40018	P17	Unit dP	0 = Pa 1 = mbar 2 = iwc	Pascal millibar inches of water column	
40019	P18	Decimals	0	4	0
40020 *	P19	Min range	-32768	32767	see P18
40021 *	P20	Max range	-32768	32767	see P18
40022	P21	Min out	Min range	Max range	see P18
40023	P22	Max out	Min range	Max range	see P18
40024	P23	Sign dP	0 = POS 1 = NEG	Vacuum without sign Vacuum with sign	
<b>Flow</b>					
40025	P24	Unit flow	0 = l/s 1 = m3/s 2 = m3/h 3 = m/s 4 = cfm	Liters per second Cubic meters per second Cubic meters per hour Meters per second Cubic feet per minute	
40026	P25	Decimals	0	4	0
40027	P26	Max flow	0	32767	see P25
40028	P27	Scale flw	0	32767	see P25
40029	P28	Set flow	0	32767	see P25
40030	P29	<i>Not used</i>			
40031	P30	<i>Not used</i>			
40032	P31	<i>Not used</i>			
40033	P32	<i>Not used</i>			

Register	No	Lead text	Min	Max	Decimals
<b>Alarm 1</b>					
40034	P33	Mode	0 = OFF 1 = HIGH 2 = LOW	Deactivated Alarm at high limit Alarm at low limit	
40035	P34	Source	0 = dP 1 = FLOW	Pressure Flow	
40036	P35	Limit	MinRange	MaxRange	see P18 alt. P25
40037	P36	Delay [s]	0	3600	0
40038	P37	Reset	0 = MANUAL 1 = AUTO	Manual reset Automatic reset	
40039	P38	Beeper	0 = OFF 1 = ON	No beeper at alarm Alarm with beeper	
40078	P77	Mute	0 = BEEP 1 = BEEP&RELAY	Mute only beeper Mute beeper and reset relay	
40040	P39	Mute time	0	3600	0
<b>Alarm 2</b>					
40041	P40	Mode	0 = OFF 1 = HIGH 2 = LOW	Deactivated Alarm at high limit Alarm at low limit	
40042	P41	Source	0 = dP 1 = FLOW	Pressure Flow	
40043	P42	Limit	MinRange	MaxRange	see P18 alt. P25
40044	P43	Delay [s]	0	3600	0
40045	P44	Reset	0 = MANUAL 1 = AUTO	Manual reset Automatic reset	
40046	P45	Beeper	0 = OFF 1 = ON	No beeper at alarm Alarm with beeper	
40079	P78	Mute	0 = BEEP 1 = BEEP&RELAY	Mute only beeper Mute beeper and reset relay	
40047	P46	Mute time	0	3600	0
<b>PI Controller</b>					
40048	P47	Mode	0 = OFF 1 = ON	Deactivated Controller active	
40049	P48	Source	0 = dP 1 = FLOW	Pressure Flow	
40050	P49	Set point	MinRange	MaxRange	see P18 alt. P25
40051	P50	<i>Not used</i>			
40052	P51	<i>Not used</i>			
40053	P52	<i>Not used</i>			
40054	P53	<i>Not used</i>			
40055	P54	<i>Not used</i>			
40056	P55	<i>Not used</i>			
40057	P56	<i>Not used</i>			
40058	P57	<i>Not used</i>			
40059	P58	NZ [%]	1	50	0
40060	P59	P-band [%]	0	9999	0
40061	P60	I-time [s]	0	999	0
40062	P61	BZ [%]	0	100	0
40063	P62	I-time BZ[s]	0	999	0
40080	P79	<i>Not used</i>			
40081	P80	<i>Not used</i>			
40064	P63	Output	0 = DIRECT 1 = REVERSE	Increase when CV > SP Decrease when CV > SP	
40065	P64	Min output	0	100	0
40066	P65	Max output	0	100	0
40067	P66	<i>Not used</i>			
40068	P67	<i>Not used</i>			
40069	P68	<i>Not used</i>			
40070	P69	<i>Not used</i>			

Register	No	Lead text	Min	Max	Decimals
40071	P70	<i>Not used</i>			
40072	P71	<i>Not used</i>			
40073	P72	<i>Not used</i>			
40085	P84	<i>Not used</i>			
<b>AutoZero (option)</b>					
40082	P81	Interval[h]	0,0	60,0	1
40086	P85	Output	0 = Volt 2 1 = mA 2	Output 2 - Volt Output 2 - mA	
<b>Communication</b>					
40074	P73	Address	1	247	0
40075	P74	Baud	0 = OFF 1 = 600 2 = 1200 3 = 2400 4 = 4800 5 = 7200 6 = 9600 7 = 14400 8 = 19200 9 = 38400 10 = 57600 11 = 115200 12 = 128000	Deactivated Baudrate Baudrate Baudrate Baudrate Baudrate Baudrate Baudrate Baudrate Baudrate Baudrate Baudrate	
40076	P75	Parity	0 = NONE 1 = ODD 2 = EVEN	No parity Odd parity Even parity	
40077	P76	Protect	0 = NO 1 = YES	Read and Write Read only	

\* = Read only

### Current values

Register	No	Measuring value	Min	Max	Decimals
30001	I00	Pressure (dP)	MinRange	MaxRange	see P18
30002	I01	Flow	0	MaxFlow	see P25
30003	I02	Output signal PI-controller %	0,00	100,00	2
30004	I03	Set point PI-controller	MinRange	MaxRange	see P18 alt. P25
30005	I04	<i>Not used</i>			
30006	I05	<i>Not used</i>			
30007	I06	<i>Not used</i>			
30008	I07	Status input MUTE	0 = OPEN 1 = CLOSED	Contact open Contact closed	
30009	I08	<i>Not used</i>			
30010	I09	<i>Not used</i>			
30011	I10	Status automatic zero adjustment (option)	0 = OFF 1 = PRE 2 = EVAC 3 = DO_ZERO 4 = POST 5 = PAUSE 6 = EXTRA	Deactivated Preparing AutoZero Evacuating air from sensor Execute AutoZero After AutoZero Waiting for next AutoZero Extra AutoZero	
30012	I11	Status alarm limits	0 = NO 1 = ALM1 2 = ALM2 3 = ALM1 + ALM2	No alarm Alarm limit 1 tripped Alarm limit 2 tripped Alarm limit 1 and 2 tripped	

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