



Photo: Pt100 Modbus Converter

USER MANUAL

Modbus Converter 879

Pt100 / Pt1000



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1 Warranty

Please note the loss of warranty and non-liability by unauthorized manipulation of the system. You need a written permission of the LAMBRECHT meteo GmbH for changes of system components. These activities must be operated by a qualified technician.

The warranty does not cover:

1. Mechanical damages caused by external impacts (e. g. icefall, rockfall, vandalism).
2. Impacts or damages caused by over-voltages or electromagnetic fields which are beyond the standards and specifications in the technical data.
3. Damages caused by improper handling, e. g. by wrong tools, incorrect installation, incorrect electrical installation (false polarity) etc.
4. Damages which are caused by using the device beyond the specified operation conditions.

2 Function

The Pt-Modbus converter acquires the measuring signal of a Pt100 resp. Pt1000 temperature sensor and makes the measured value available for retrieval via Modbus RTU (RS485). Due to the simple address assignment from 1...99, up to 99 temperature sensors can be quickly integrated into a bus.



The maximum number of devices in a bus depends on the data acquisition device (Modbus master) used.

Like the other LAMBRECHT meteo Modbus RTU sensors, the Pt-Modbus converter has autoconfiguration registers (mapping), by means of which it can be automatically recognized by the data logger met[LOG] and created for the measurement, for example.

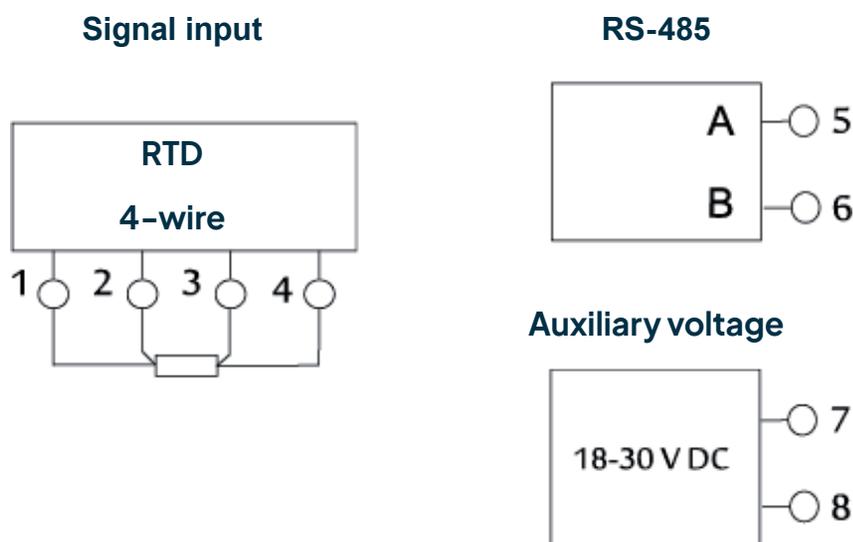
3 Initial Operation

For operation with LAMBRECHT meteo data loggers (Ser[LOG], met[LOG]) no further configuration of the converter is necessary. If several temperature sensors are to be operated in one bus, the respective device address can simply be set via the coding switches on the side.

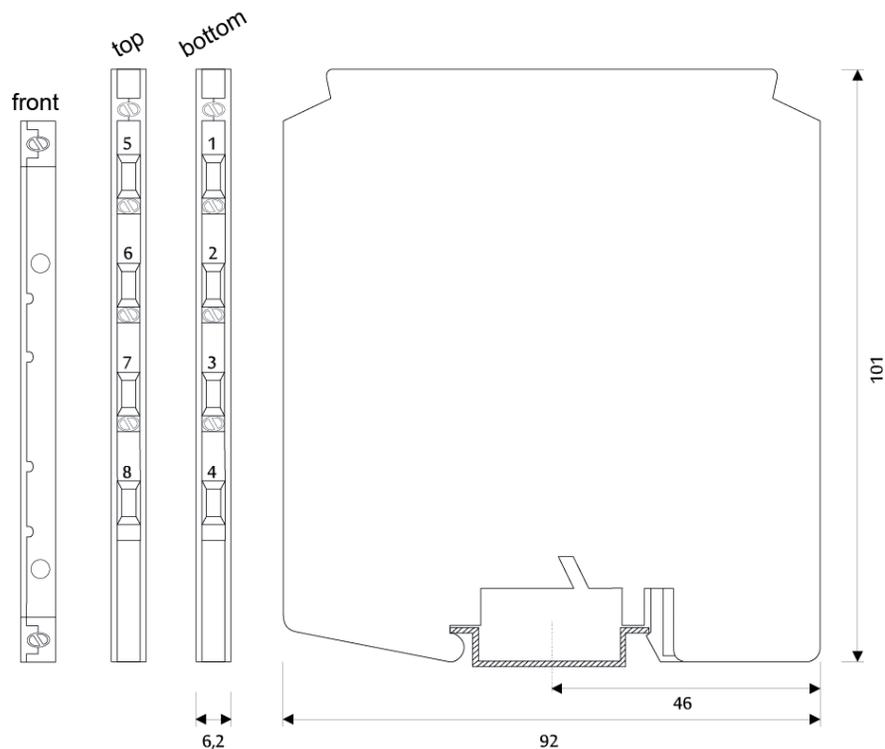


The autoconfiguration of the met[LOG] only supports devices in the address range 1...25. Devices with addresses >25 must be created manually.

The operating voltage is indicated by a green LED. Data communication is signaled by a yellow LED. Invalid measuring signals outside the defined measuring range are detected. In this case, the green LED flashes.



4 Dimensioned Drawing



5 Modbus Protocol

5.1 General

The LAMBRECHT meteo Modbus sensors follow the specification of the Modbus organization: "MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1b3". (See www.modbus.org).

5.2 Data Encoding

MODBUS uses the "Big-Endian" format for addresses and data. This means that if a value is transmitted with a number format which is larger than a single byte, that the "most significant byte" is sent first.

Example Big-Endian:

Register size value

16 - bits 0x1234 is transmitted in the sequence: 0x12 0x34

To obtain the real measuring value, divide the received register value by the divisor (provided in 6.5, 6.6).

Values of -9999 indicate an internal sensor error.

5.3 Standard Configuration - Default

Baud rate: 19200 Baud
 Byte format: 8E1 (1 start bit, 8 data bits, 1 parity bit (even parity), 1 stop bit)
 RTU Sensor address: 12

DEFAULT ADDRESSES OF THE LAMBRECHT METEO SENSORS:

Address	Sensor
1	Windspeed
2	Wind direction
3	Precipitation rain[e]
4	THP
5	EOLOSIND
6	com[b]
7	PREOS
8	ARCO
9	u[sonic]
10	Pyranometer 2nd Class
11	Secondary standard Pyranometer
12	PT100 to Modbus converter (temperature)
13	u[sonic]WS7

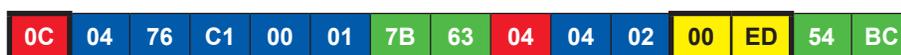
5.4 Modbus Commands

- "Read Holding Register" command: 0x03 (descriptive sensor data registers)
- "Read Input Register" command: 0x04 (every measured value is to be requested individually)
- "Write Multiple Register" command: 0x10 (write to configuration registers)

5.5 Instantaneous Values / Realtime Values (Input Register)

Register	Parameter name	Unit	Divisor	Quantity of registers	Access type
30401	Air temperature	°C	10	1	Read only

Example: Retrieve the air temperature



LEN	Transmission	Source	Dest	Function	Func Desk	Checksum	
6	Query =>	Master	Slave 12	Read Input Register (4)	Address=30401, Quantity of Register=1	OK:637B	
LEN	Transmission	Source	Dest	Function	Func Desk	Data	Checksum
5	Response <=	Slave 12	Master	Read Input Register (4)	Byte count=2	00 ED	OK:BC54

5.6 Configuration Registers (Holding Register)

Register	Parameter name	Allowed values	Quantity of registers	Access type
40001	Modbus address device		1	Write only
40200	Baud rate	96 = 9600 192 = 19200 384 = 38400	1	Write only
40201	Parity	1 = even 0 = none	1	Write only

The device must be restarted after each change of a setting!

Example: Change the RTU address from 13 to 1

0D	10	9C	41	00	01	02	00	01	61	88	0D	10	9C	41	00	01	7F	41
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

LEN 9	Transmission Query =>	Source Master	Dest Slave 13	Function Write Multiple Register (16)	Func Desk Address=40001, Quantity=1	Byte count 2	Register values 00 01	Checksum OK:8861
LEN 6	Transmission Response <=	Source Slave 13	Dest Master	Function Write Multiple Register (16)	Func Desk Address=40001, Quantity=1	Checksum OK:417F		

5.7 Auto Configuration

All Lambrecht Modbus sensors offer the experienced user the possibility to implement an auto-configuration in his Modbus master based on additional information stored in the sensor. The necessary information can be found in the document “General Manual for LAMBRECHT meteo Modbus Sensors”.

5.8 Connectable Sensors

All common 4-wire Pt100 temperature sensors can be connected to the Pt100 Modbus converter. Compared to 2-wire technology, 4-wire technology offers significantly higher measuring accuracy and remains unaffected by the cable length.

COMPATIBLE LAMBRECHT METEO TEMPERATURE SENSORS (PT100):

ID	Description
00.08290.000030	Module temperature sensor
00.08280.010507	Air, soil and water thermometer Pt100, 1/3 DIN
00.08281.008005	Air temperature sensor Pt100, 1/3 DIN
00.08241.000000	Grass temperature sensor with protection device

6 Technical Data

Resistance thermometers Pt100 / Pt1000 according to DIN EN 60751	
ID 00.08790.000000 Pt100-Modbus converter	
ID 00.08790.010000 Pt1000-Modbus converter	
Measuring range	-40...+80 °C
Connection technology	4-wire
Resolution	16 bit
Accuracy	0.5 K
Max. line resistance ¹⁾	10 Ohm/line
Sensor supply Pt100 / Pt1000	1 mA
Measurement rate	1 measurement/s
Temperature influence	± 100 ppm/K of final value
RS485 bus	
Software protocol	Modbus RTU
Data format	19200, 8, E, 1
Max. bus users	99
Bus termination	120 Ohm at both ends
Max. bus length	500 m
Cable	shielded
LEDs	
Green	power supply (flashes in case of signal error)
Yellow	RS485 communication
Controls	
Address switch	2 address switches for 10 + 1
Power supply	
Supply voltage	18...30 VDC
Max. power consumption at 24 VDC	300 mW
Housing	
Design	6.2x92x101 mm (WxHxD)
Construction	DIN rail 35mm, EN 50022
Protection class	IP 20
Connection technology	screw terminals
Tightening torque terminals	0.5 Nm
Conductor cross section	max. 2.5 mm ²
Weight	approx. 30 g
Ambient conditions	
Permissible ambient temperature	-40...+80 °C
EMC	
Product family norm ¹⁾	EN 61326
Emitted interference	EN 55011, CISPR11 Cl. B
¹⁾ During interference, small signal deviations are possible.	
Electrical safety	
Product family norm	EN 61010-1
Galvanic isolation, test voltages	
Signal / Supply	1.5 kV, 50 Hz (1 min.)
Signal / RS485 bus	no galvanic isolation

7 Disposal

LAMBRECHT meteo GmbH is listed and registered at the Stiftung Elektro-Altgeräte Register ear under:

WEEE-Reg.-Nr. DE 45445814

In the category of monitoring and control instruments, device type: "Monitoring and control instruments for exclusively commercial use".

Within the EU



The device has to be disposed according to the European Directives 2002/96/EC and 2003/108/EC (Waste Electrical and Electronic Equipment). Do not dispose the old device in the household waste! For an environmentally friendly recycling and disposal of your old device, contact a certified disposal company for electronic waste.

Outside the EU

Please follow the regulations in your country regarding the appropriate disposal of waste electronic equipment.