

DV31.11065.004.3.Modbus_Manual_V1.1.docx	<i>Rotronic AG Bassersdorf, Switzerland</i>
Document code	Unit
Produktname: 11065.RMS-HCD	Technische Dokumentation
Document title	Document Type
	Page 1 of 10

Technical documentation

Product

Name	RMS-HCD
Project number	11065
Version	V4.0

Document History

Version	Date	Author	Note
003.2	27.07.2020	ENP	Initial Version
004.3	22.04.2021	ENP	Minor changes

DV31.11065.004.3.Modbus_Manual_V1.1.docx Document code	<i>Rotronic AG</i> <i>Bassersdorf, Switzerland</i> Unit
Produktname: 11065.RMS-HCD Document title	Technische Dokumentation Document Type
	Page 2 of 10

Index

1.	Summary.....	3
2.	Commands.....	4
2.1	Device Specific Input Registers (read only).....	4
2.1.1	Device Data.....	4
2.1.2	Current Values:	4
2.2	Device Specific Holding Registers	6
2.2.1	Device Adress	6
2.2.2	Byte Order / Swap modes	8
3.	Review.....	10

DV31.11065.004.3.Modbus_Manual_V1.1.docx Document code	<i>Rotronic AG</i> <i>Bassersdorf, Switzerland</i> Unit
Produktname: 11065.RMS-HCD Document title	Technische Dokumentation Document Type
	Page 3 of 10

1. Summary

This document describes the Modbus communication protocol, of the HCD-S

DV31.11065.004.3.Modbus_Manual_V1.1.docx	Rotronic AG Bassersdorf, Switzerland
Document code	Unit
Produktname: 11065.RMS-HCD	Technische Dokumentation
Document title	Document Type
	Page 4 of 10

2. Commands

Note:

- The default probe address of the HCD is 247. The probe may have a different address programmed, but it always answers a request to the address 0 (broadcast). A request to the address 0 is answered by all connected HCD probes in the network.
- For the Checksum perform a Modbus CRC16 calculation.

Attention!

Registers in Modbus are addressed starting at zero. Therefore registers numbered e.g. 31'001...31'008 are addressed as 31'000...31'007.

2.1 Device Specific Input Registers (read only)

2.1.1 Device Data

Register	Name	Description	Data type
30'001	Serial Number	• Serial number of the device (part 1)	Int. 32 Bit
30'002		• Serial number of the device (part 2)	

2.1.2 Current Values:

Current values in 32-bit IEEE754 float format.

Note!

These values are changing every measurement cycle, so always read the two corresponding registers in one Modbus command.

Register	Name	Description	Data type
31'001	Humidity	• Current humidity value (part 1)	Float 32 Bit
31'002		• Current humidity value (part 2)	
31'003	Temperature	• Current temperature value (part 1)	Float 32 Bit
31'004		• Current temperature value (part 2)	
31'005	Calculation	• Current calculation value (part 1)	Float 32 Bit
31'006		• Current calculation value (part 2)	
31'007	Measurement flags Humidity	• Current measurement flags humidity	Int. 16bit
31'008	Measurement flags Temperature	• Current measurement flags temperature	Int. 16bit

DV31.11065.004.3.Modbus_Manual_V1.1.docx	Rotronic AG Bassersdorf, Switzerland
Document code	Unit
Produktname: 11065.RMS-HCD	Technische Dokumentation
Document title	Document Type
	Page 5 of 10

2.1.2.1 Read Current Float Value (Registers 31'001 to 31'008)

Example:

Transmit	01 04 79 18 00 08 68 97
Receive	01 04 10 e6 3a 33 42 bb 93 bf 41 ff ff ff f7 00 00 00 00 97 8a

Field	Bytes	Value	Description
Checksum	2	CRC	CRC Checksum
RTU number	1	0x01	Modbus RTU Address
Function code	1	0x04	Read Discret Inputs
Starting address	2	0x7918	= 31'000 (Attention! register number – 1)
Quantity of input registers	2	0x0008	= 8, means read 8 registers
Byte count	1	0x10	= $16 \triangleq 2 * N$, means numbers of returned bytes
Input registers	2 * N	0x42333ae6	= 44.81 %rh Humidity
		0x41bf93bb	= 23.95 °C Temperature
		0x7fffffff	= NAN (calculation is disabled)
		0x0000	= 0, No measurement error
		0x0000	= 0, No measurement error

For detailed information about Modbus protocol *Read Discrete Inputs* see:
http://modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf.

DV31.11065.004.3.Modbus_Manual_V1.1.docx	Rotronic AG Bassersdorf, Switzerland
Document code	Unit
Produktname: 11065.RMS-HCD	Technische Dokumentation
Document title	Document Type
	Page 6 of 10

2.2 Device Specific Holding Registers

Via the Modbus **Holding Registers** you can read and write device specific data of the HCD probe.

Assisted Modbus commands are *Read Holding Registers* (0x03), *Write Single Register* (0x06)

Function 03/06 – Read/Write Single register

Register	Name	Description	Data type
40001	Device address	Device address (Default 0x00F7)	Integer 16-bit
40002	Byte Order	Swap modes / Byte Order (Default 0x0000 - No swap)	Integer 16-bit

2.2.1 Device Address

2.2.1.1 Read Modbus Address (Registers 40'001)

Example:

Note: the device answers to address 0. This can be used to get the current device address

Transmit	00 03 9c 40 00 01 aa 5f
Receive	01 03 02 00 01 79 84

Field	Bytes	Value	Description
Checksum	2	CRC	CRC Checksum
RTU number	1	0x01	Modbus RTU Address
Function code	1	0x03	Read Holding Register
Starting address	2	0x9c40	= 40001 (Attention! register number – 1)
Quantity of Holding registers	2	0x0001	= 1, means read 1 register
Byte count	1	0x02	= $2 \triangleq 2 * N$, means numbers of returned bytes
Holding register	N	0x0001	= 1, current address

DV31.11065.004.3.Modbus_Manual_V1.1.docx		Rotronic AG Bassersdorf, Switzerland
Document code		Unit
Produktname: 11065.RMS-HCD		Technische Dokumentation
Document title		Document Type
		Page 7 of 10

2.2.1.2 Write Modbus Adress (Registers 40'001)

Example:

Note: The device answers with the current Modbus RTU Address, afterwards the address is changed.

Transmit	F7 06 9C 40 00 01 73 18
Receive	F7 06 9C 40 00 01 73 18

Field	Bytes	Value	Description
Checksum	2	CRC	CRC Checksum
RTU number	1	0xF7	Modbus RTU Address
Function code	1	0x06	Write Holding Register
Starting address	2	0x9c40	= 40001 (Attention! register number – 1)
Value	2	0x0001	= 1, new Modbus address

DV31.11065.004.3.Modbus_Manual_V1.1.docx	Rotronic AG Bassersdorf, Switzerland
Document code	Unit
Produktname: 11065.RMS-HCD	Technische Dokumentation
Document title	Document Type
	Page 8 of 10

2.2.2 Byte Order / Swap modes

2.2.2.1 Selectable Swap Modes for Rotronic Devices

Selectable swap modes only for 32-bit Float and 32-bit Integer values based on Little Endian memory organisation.

Value	Swap Mode	Source Bytes	Target Bytes
0x0000	Big endian - No Swap	[a b] [c d]	[a b c d]
0x0001	Little endian - byte and word swap	[a b] [c d]	[d c b a]
0x0002	Mid-big endian - byte swap	[a b] [c d]	[b a d c]
0x0003	Mid-little endian - word swap	[a b] [c d]	[c d a b]

2.2.2.2 Read Swap mode (Registers 40'001)

Example:

Transmit	01 03 9c 41 00 01 fa 4e
Receive	01 03 02 00 02 39 85

Field	Bytes	Value	Description
Checksum	2	CRC	CRC Checksum
RTU number	1	0x01	Modbus RTU Address
Function code	1	0x03	Read Holding Register
Starting address	2	0x9c41	= 40002 (Attention! register number – 1)
Quantity of Holding registers	2	0x0001	= 1, means read 1 register
Byte count	1	0x02	= $2 \triangleq 2 * N$, means numbers of returned bytes
Holding register	N	0x0002	= 2, Mid-big endian - byte swap

DV31.11065.004.3.Modbus_Manual_V1.1.docx		Rotronic AG Bassersdorf, Switzerland
Document code		Unit
Produktname: 11065.RMS-HCD		Technische Dokumentation
Document title		Document Type
		Page 9 of 10

2.2.2.3 Write Swap Mode

Example:

Set Swap Mode "Mid-big endian - byte swap"

Transmit	01 06 9c 41 00 02 76 4f
Receive	01 06 9c 41 00 02 76 4f

Field	Bytes	Value	Description
Checksum	2	CRC	CRC Checksum
RTU number	1	0x01	Modbus RTU Address
Function code	1	0x06	Write Holding Register
Starting address	2	0x9c41	= 40002 (Attention! register number – 1)
Value	2	0x0002	= 2, Mid-big endian - byte swap

DV31.11065.004.3.Modbus_Manual_V1.1.docx Document code	Rotronic AG Bassersdorf, Switzerland Unit
Produktname: 11065.RMS-HCD Document title	Technische Dokumentation Document Type
	Page 10 of 10

3. Review

Dokument Review (Spezifikation)

Name	
Datum	
Bemerkungen	

Dokument-Review (Verifikation)

Name	
Datum	
Bemerkungen	