

White Zelle Controller

Software Protocol Description

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5.2.5. RelayStatus	Fehler! Textmarke nicht definiert.

1. Revision History

Rev.	Date	Name	Comment
00	09.10.2013	bm	Initial Revision.
01	30.05.2014	ue/bm	Different changes because of redesign of White-Cell.

2. General function

2.1. Operation Mode

To start Operation Mode the Software has to be sent a start command to the Controller Board. After this the Controller starts sending a full set of Operation Data every 100ms.

2.2. Connection Parameter (USB/RS232)

Baudrate	57600 Baud
Data	8 Bits
Stop	1 Stop Bit
Parity	None
Flow	None

2.3. Data Integrity

Communication between PC and Main Controller is verified by a CRC-Checksum (CRC-Standard CrcCCITT = $x^{16}+x^{12}+x^5+1$. The Start-value is 0).

3. Data Types

Following data types are used in the data protocols and commands.

Name	Bytes	Range
Byte	1	0..255
Word	2	0..65535
Int16	2	-32.768..32767
Longword	4	0..4294967295
Longint	4	-2147483648..2147483647

High-Byte is sent first.

4. Commands PC ⇌ Controller Board

4.1. Command-Structure

Byte:	0	1	2	3	4	5	6	7	8
	Start (02h)	CMD ID	Data 0	Data 1	Data 2	Data 3	Stop (03h)	CRC (High)	CRC (Low)

Byte No.	Name	Type	Value	Description
0	Start	Byte	02h	fix, Start-Byte
1	CMD	Byte	0..255	Command Code, refer to table below
2	Data 0	Byte	0..255	Data transfer, 1 st Byte, unused is zero
3	Data 1	Byte	0..255	Data transfer, 2 nd Byte, unused is zero
4	Data 2	Byte	0..255	Data transfer, 3 rd Byte, unused is zero
5	Data 3	Byte	0..255	Data transfer, 4 th Byte, unused is zero
6	Stop	Byte	03h	Stop-Byte
7..8	CRC	Int16	0..65535	Checksum of previous Bytes, CRC16-CCITT (1021h)

4.2. Command-List Controller Board

CMD	Name	Data-type	Value	Unit	Beschreibung
1	StartCom	-	-	-	Start Operation Mode of GDS
2	StopCom	-	-	-	Stop Operation Mode of GDS
3	StartBootloader	-	-	-	Starts the bootloader mode for firmware update, normal communication is lost, a special bootloader program does the update
4	SetValves	Byte	0..255	-	Set valves
5	SetPumpPower	Byte	0..100	%	0 = stop pump 100 = pump max. power
6	SetReserve	Byte	0, 1	-	0 = not active 1 = active
10	SetTempHeater	Int16	2000..6000	°C*100	Set temperature heater 20,00°C..60,00°C
11	SetPressureSetpoint	Int16	1200..7000	mbar	Pressure setpoint (absolute)
12	StartPres.Regulation	-	-	-	Start pressure regulation
13	StopPres.Regulation	-	-	-	Stop pressure regulation
14	StartHeat.Regulation	-	-	-	Start heater regulation
15	StopHeat.Regulation	-	-	-	Stop heater regulation

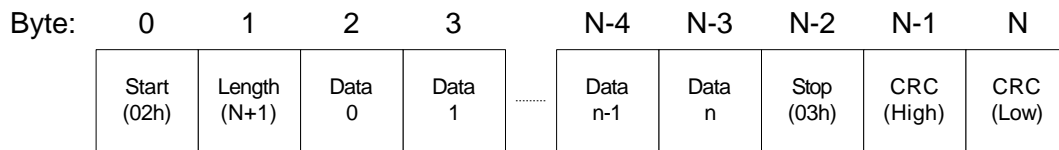
4.3. Command Data Details

4.3.1. SetValve

Bit	Function
0	V1 (0 = close, 1 = open)
1	V2 (0 = close, 1 = open)
2	V3 (0 = close, 1 = open)
3	V4 (0 = close, 1 = open)
4	V5 (0 = close, 1 = open)
5	V6 (0 = close, 1 = open)
6	V7 (0 = close, 1 = open)
7	V8 (0 = close, 1 = open)

5. Operation Data

5.1. Data-Structure



N = 78

Length = N+1 = 79

Byte No.	Name	Type	Value	Unit	Description
0	Start	Byte	02h	-	fix, Start Byte, signals start of frame
1	Length	Byte	N+1	-	Number of Bytes of complete protocol-frame, Byte 0..N, incl. Start/Stop bytes and Checksum
2	ControllerStatus	Word	0..65535	-	Controller White Zelle Controller
4	ErrorFlags	Word	0..65535	-	Error Flags Controller
6	ValveStatus	Byte	0..255	-	Valve Status
7	PowerHeater	Byte	0..100	%	Heater Power 0..100%
8	TempHeater	Int16	0..6000	°C*100	Temperature Heater 0,00..60,00°C
10	SetpointHeater	Int16	0..6000	°C*100	Temperature Heater 0,00..60,00°C
12	ActualPressure	Int16	0..10000	mbar	Actual Pressure 0..10 000mbar
14	PressureSetpoint	Int16	0..10000	mbar	Pressure Setpoint 0..10 000mbar
16	Reserve	Byte	--	--	--
17	PumpPower	Byte	0..100	%	Pump Power
18	TempPT100_1	Int16	0..12000	°C*100	Temperature Heater 0,00..120,00°C
20	TempPT100_2	Int16	0..12000	°C*100	Temperature Heater 0,00..120,00°C
22	Counter	Byte	0..255	-	Dataset counter
23	Stop	Byte	03h	-	fix, Stop Byte, signals end of frame
24	CheckSum	Word	0..65535	-	CheckSum over all previous Bytes, CRC16-CCITT (1021h)

All data bytes are sent as numeric format. So the Control Software is needed to decode this data structure.

5.2. Data Details

5.2.1. ControllerStatus

Bit	Name	Function / Description	Bit-Status	
			False (0)	True (1)
0	StatusPump	Status of pump	Off	Pump Power > 0
1	StatusReserveOut	Status of Reserve Out	Off	on
2	PressureRegl.	Pressure regulation active?	Not active	active
3	TempHeatReady	Temperature of Heater ok (setpoint reached)	Not ready	Ready
4	HeaterRegulation	Heater regulation active?	Not active	active
5	--			
6	--			
7	--			
8	--			
9	--			
10	--			
11	--			
12	--			
13	--			
14	--			
15	--			
16	--			

5.2.2. ErrorCode

Code	Description
0	no error
General	
1	µC Error
Pressure	
50	Pressure sensor error (PIRC1)
Temperature	
100	Temperature sensor error
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5.2.3. Valves

Bit	Function
0	State of valve V1 (0 = close, 1 = open)
1	State of valve V2 (0 = close, 1 = open)
2	State of valve V3 (0 = close, 1 = open)
3	State of valve V4 (0 = close, 1 = open)
4	State of valve V5 (0 = close, 1 = open)
5	State of valve V6 (0 = close, 1 = open)
6	State of valve V7 (0 = close, 1 = open)
7	State of valve V8 (0 = close, 1 = open)