

CTR 210 (i)



Revision 3.1

Software version 2.05

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Important!

These instructions should be used in conjunction with the standard Installation and Operating Instructions for CTR.

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1. General Information

This manual shows the functions and possibilities of the Modbus communication to the CTR 210(i).

1.1. Interface settings

The CTR interface works with the following parameters (settings):

	<i>Modbus RTU</i>	<i>Modbus ASCII</i>
Data Bits:	8	7
Stop Bits:	1	1
Parity:	Even	Eve

1.2. Baud rate

The baud rate can be entered between 2400 and 19.200 baud.

1.3. Connection of the interface

Non-Ex devices:

There is a CTR 210 RS 485 interfaces with the terminals A, B and GND.

The last Batching Master in the bus has to be terminated with a 120 Ohm resistor, connected parallel between the terminals A and B.

Intrinsically safe devices CTR 210i

There is a CTR 210i intrinsically safe TTY interfaces with the terminals RxD, TxD and GND. These interfaces must be connected strictly to the interface and power supply module IPC 3x0i, with a RS485 output at the safe side.

For the connection please see the installation manuals of CTR 210i and IPC 3x0i module. Please take care that the TxD (transmit data) need to be connected always to the RxD (receive data).

The RS485 interface of the last IPC 3x0i module in the bus has to be terminated with a 120 Ohm resistor, connected parallel between the terminals A and B.

1.4. Cable specification

These cable requirements have to be observed strictly otherwise we can't guaranty an error-free communication.

For CTR 210 (Non-Ex devices) a shielded twisted pair cable (impedance 100–120 Ω) has to be used. Connect the cable shield to the potential equalisation PE.

For intrinsically safe CTR 210i a shielded cable with a cable cross-section of minimal 3 x 0,5 mm² has to be used.

Connect the cable shield to the potential equalisation PE.

2. Holding Register (Basis 4xxxx)

The following part of the manual part of the manual explains the possibilities of the Modbus communication via the Holding Registers. Some of them are read only (R/O) and others can also be written (R/W).

In the Holding Registers all programmed parameters and settings of the CTRs are shown. It is possible to change most of this settings by the in Modbus communication.

Storing of parameter changes:

Changes of the parameters and settings will be stored and activated in the Batching Master after writing the value "1" into Holding Register 24 (safe parameters).

2.1. Working variables

Reg. no.	Description	Data type	Access	Modbus function
1	Device identification, Value '6' is read	16 Bit Int	R/O	3
2	Version number e. g. 105 for version 1.05	16 Bit Int	R/O	3
3	Device no.	16 Bit Int	R/O	3
4	Input 1. AD converter	16 Bit Int	R/O	3
5	Input 2. AD converter	16 Bit Int	R/O	3
6	Input 3. AD converter	16 Bit Int	R/O	3
7	Input 1 normalized (0-100%)	16 Bit Int	R/O	3
8	Input 2 normalized (0-100%)	16 Bit Int	R/O	3
9	Input 3 normalized (0-100%)	16 Bit Int	R/O	3
10	Set point 1 standardised (0-100%)	16 Bit Int	R/O	3
11	Set point 2 standardised (0-100%)	16 Bit Int	R/O	3
12	Manual/Auto-flag – Controller 1	16 Bit Int	R/O	3
13	Manual/Auto-flag – Controller 2	16 Bit Int	R/O	3
14	Status - Alarms bit0 – Alarm1 bit1 – Alarm2 bit2 – Alarm3 bit3 – Alarm4 bit4 – Alarm5 bit5 - Alarm6	16 Bit Int	R/O	3
15	Status – digital inputs		R/O	3
16	Status – digital outputs		R/O	3
17	Status – sensor break bit0 – Ain1 bit1 – Ain2 bit2 - Ain3		R/O	
18	Analogue output 1 standardised (0-100%)	16 Bit Int	R/O	
19	Analogue output 2 standardised (0-100%)	16 Bit Int	R/O	3
20	PWM register for analogue output 1	16 Bit Int	R/W	03, 06, 16
21	PWM register for analogue output 2	16 Bit Int	R/W	03, 06, 16

Holding Register (Basis 4xxxx)

Reg. no.	Description	Data type	Access	Modbus function
22	0 – blocked controlling analogue outputs from controller. The outputs could be controlled by the register 20 and 21.	16 Bit Int	R/W	03, 06, 16
23	Setpoint_Write – if set to 1 the set point are written to the FRAM	16 Bit Int	R/W	03, 06, 16
24	Parameter_Write – if set to 1 the parameters are written to FRAM	16 Bit Int	R/W	03, 06, 16
25-40	not used	16 Bit Int	R/O	3
41	main setpoint	16 Bit Int	R/W	03, 06, 16
42	setpoint di_1	Flag	R/W	03, 06, 16
43	setpoint di_2	Flag	R/W	03, 06, 16
44	setpoint di_3	Flag	R/W	03, 06, 16
45	setpoint di_4	Flag	R/W	03, 06, 16
46	setpoint di_5	16 Bit Int	R/W	03, 06, 16
47	setpoint di_6	Flag	R/W	03, 06, 16
48	main setpoint for ratio controller	16 Bit Int	R/W	03, 06, 16
49	setpoint di_1 for ratio controller	16 Bit Int	R/W	03, 06, 16
50	setpoint di_2 for ratio controller	16 Bit Int	R/W	03, 06, 16
51	setpoint di_3 for ratio controller	16 Bit Int	R/W	03, 06, 16
52	setpoint di_4 for ratio controller	16 Bit Int	R/W	03, 06, 16
53	setpoint di_5 for ratio controller	16 Bit Int	R/W	03, 06, 16
54	setpoint di_6 for ratio controller	16 Bit Int	R/W	03, 06, 16
55	setpoint for second controller	16 Bit Int	R/W	03, 06, 16
56	Operation point Y0 - Par1	16 Bit Int	R/W	03, 06, 16
57	Operation point Y0 - Par2	16 Bit Int	R/W	03, 06, 16
58	Operation point Y0 - Par3	16 Bit Int	R/W	03, 06, 16

2.2. Parameter variables

Reg. no.	Description	Data type	Access	Modbus function
1001	kp_1	16 Bit Int	R/W	03, 06, 16
1002	kp_2	16 Bit Int	R/W	03, 06, 16
1003	kp_3	16 Bit Int	R/W	03, 06, 16
1004	kd_1	16 Bit Int	R/W	03, 06, 16
1005	kd_2	16 Bit Int	R/W	03, 06, 16
1006	kd_3	16 Bit Int	R/W	03, 06, 16
1007	tn_1	16 Bit Int	R/W	03, 06, 16
1008	tn_2	16 Bit Int	R/W	03, 06, 16
1009	tn_3	16 Bit Int	R/W	03, 06, 16
1010	reserve	16 Bit Int	R/W	03, 06, 16
1011	reserve	16 Bit Int	R/W	03, 06, 16
1012	reserve	16 Bit Int	R/W	03, 06, 16
1013	tv_1	16 Bit Int	R/W	03, 06, 16
1014	tv_2	16 Bit Int	R/W	03, 06, 16
1015	tv_3	16 Bit Int	R/W	03, 06, 16
1016	decp_1	16 Bit Int	R/W	03, 06, 16
1017	decp_2	16 Bit Int	R/W	03, 06, 16
1018	reserve	16 Bit Int	R/W	03, 06, 16
1019	dsp_x0_1	16 Bit Int	R/W	03, 06, 16
1020	dsp_x0_2	16 Bit Int	R/W	03, 06, 16
1021	dsp_x100_1	16 Bit Int	R/W	03, 06, 16
1022	dsp_x100_2	16 Bit Int	R/W	03, 06, 16
1023	sp_min_1	16 Bit Int	R/W	03, 06, 16
1024	sp_min_2	16 Bit Int	R/W	03, 06, 16
1025	sp_max_1	16 Bit Int	R/W	03, 06, 16
1026	sp_max_2	16 Bit Int	R/W	03, 06, 16
1027	sp_min_VHT	16 Bit Int	R/W	03, 06, 16
1028	sp_max_VHT	16 Bit Int	R/W	03, 06, 16
1029	s_sp_1	16 Bit Int	R/W	03, 06, 16
1030	s_sp_2	16 Bit Int	R/W	03, 06, 16
1031	s_sp_VHT	16 Bit Int	R/W	03, 06, 16
1032	reserve	16 Bit Int	R/W	03, 06, 16
1033	sp_ramp	16 Bit Int	R/W	03, 06, 16
1034	reserve	16 Bit Int	R/W	03, 06, 16
1035	out_min_1	16 Bit Int	R/W	03, 06, 16
1036	out_min_2	16 Bit Int	R/W	03, 06, 16
1037	out_max_1	16 Bit Int	R/W	03, 06, 16
1038	out_max_2	16 Bit Int	R/W	03, 06, 16
1039	out_s_1	16 Bit Int	R/W	03, 06, 16
1040	reserve	16 Bit Int	R/W	03, 06, 16
1041	out_s_2	16 Bit Int	R/W	03, 06, 16
1042	reserve	16 Bit Int	R/W	03, 06, 16
1043	out_init_1	16 Bit Int	R/W	03, 06, 16
1044	out_init_2	16 Bit Int	R/W	03, 06, 16
1045	out_ramp	16 Bit Int	R/W	03, 06, 16

Holding Register (Basis 4xxxx)

Reg. no.	Description	Data type	Access	Modbus function
1046	reserve	16 Bit Int	R/W	03, 06, 16
1047	reserve	16 Bit Int	R/W	03, 06, 16
1048	reserve	16 Bit Int	R/W	03, 06, 16
1049	sfxd	16 Bit Int	R/W	03, 06, 16
1050	sensor_min	16 Bit Int	R/W	03, 06, 16
1051	sensor_max	16 Bit Int	R/W	03, 06, 16
1052	sensor_time	16 Bit Int	R/W	03, 06, 16
1053	filter_1	16 Bit Int	R/W	03, 06, 16
1054	filter_2	16 Bit Int	R/W	03, 06, 16
1055	filter_3	16 Bit Int	R/W	03, 06, 16
1056	Ain1_Start	16 Bit Int	R/W	03, 06, 16
1057	Ain2_Start	16 Bit Int	R/W	03, 06, 16
1058	Ain3_Start	16 Bit Int	R/W	03, 06, 16
1059	Ain1_End	16 Bit Int	R/W	03, 06, 16
1060	Ain2_End	16 Bit Int	R/W	03, 06, 16
1061	Ain3_End	16 Bit Int	R/W	03, 06, 16
1062	Caption_1	String 8 Char.	R/W	03, 06, 16
- 1065				
1066	Caption_2	String 8 Char.	R/W	03, 06, 16
- 1069				
1070	reserve	16 Bit Int	R/W	03, 06, 16
1071	c1	16 Bit Int	R/W	03, 06, 16
1072	c2	16 Bit Int	R/W	03, 06, 16
1073	c3	16 Bit Int	R/W	03, 06, 16
1074	c4	16 Bit Int	R/W	03, 06, 16
1075	c5	16 Bit Int	R/W	03, 06, 16
1076	c6	16 Bit Int	R/W	03, 06, 16
1077	reserve	16 Bit Int	R/W	03, 06, 16
- 1080				
1081	alarm_stat_1	16 Bit Int	R/W	03, 06, 16
	bit 7-0 function			
	0 – X	4 – AI1		
	1 – Xgr	5 – AI2		
	2 – Xd	6 – AI3		
	3 – Xd+/-	7 – Y		
		8 – delta Ai		
		bit 8 - 0 min, 1-max		
1082	alarm_stat_2	16 Bit Int	R/W	03, 06, 16
1083	alarm_stat_3	16 Bit Int	R/W	03, 06, 16
1084	alarm_stat_4	16 Bit Int	R/W	03, 06, 16
1085	alarm_stat_5	16 Bit Int	R/W	03, 06, 16
1086	alarm_stat_6	16 Bit Int	R/W	03, 06, 16
1087	alarm_value_1	16 Bit Int	R/W	03, 06, 16
1088	alarm_value_2	16 Bit Int	R/W	03, 06, 16
1089	alarm_value_3	16 Bit Int	R/W	03, 06, 16

Reg. no.	Description	Data type	Access	Modbus function
1090	alarm_value_4	16 Bit Int	R/W	03, 06, 16
1091	alarm_value_5	16 Bit Int	R/W	03, 06, 16
1092	alarm_value_6	16 Bit Int	R/W	03, 06, 16
1093	alarm_hyst_1	16 Bit Int	R/W	03, 06, 16
1094	alarm_hyst_2	16 Bit Int	R/W	03, 06, 16
1095	alarm_hyst_3	16 Bit Int	R/W	03, 06, 16
1096	alarm_hyst_4	16 Bit Int	R/W	03, 06, 16
1097	alarm_hyst_5	16 Bit Int	R/W	03, 06, 16
1098	alarm_hyst_6	16 Bit Int	R/W	03, 06, 16
1099	alarm_time_base 0-s, 1-min, 2-h	16 Bit Int	R/W	03, 06, 16
1100	Contrast	16 Bit Int	R/W	03, 06, 16
1101	aout_stat_1	16 Bit Int	R/W	03, 06, 16
	bit 7-0 function			
	0 - Y	3 - AI3		
	1 - AI1	4 - W		
	2 - AI2	5 - Xd		
1102	aout_stat_2	16 Bit Int	R/W	03, 06, 16
1103	aout_rng_beg_1	16 Bit Int	R/W	03, 06, 16
1104	aout_rng_beg_2	16 Bit Int	R/W	03, 06, 16
1105	aout_rgn_end_1	16 Bit Int	R/W	03, 06, 16
1106	aout_rng_end_2	16 Bit Int	R/W	03, 06, 16
1107, 1108	reserve	16 Bit Int	R/W	03, 06, 16
1109	din_stat_1	16 Bit Int	R/W	03, 06, 16
	bits 7-0 function			
	0 - off	9 - Wws (SP-Ramp stop)		
	1 - Ybl (output freeze)	10 - Hd		
	2 - Ys	11 - Par2		
	3 - Ys2	12 - Par3		
	4 - YsH (Ys + Hand on. Hand stays after)	13 - Xin		
	5 - Yex (external Y)	14 - Begr		
	6 - Ws	15 - Up		
	7 - Wbl	16 - Do		
	8 - Ww (SP-Ramp off)	17 - SPx - select setpoint x bit 8 - 0-dir, 1-rev		
1110	din_stat_2	16 Bit Int	R/W	03, 06, 16
1111	din_stat_3	16 Bit Int	R/W	03, 06, 16
1112	din_stat_4	16 Bit Int	R/W	03, 06, 16
1113	din_stat_5	16 Bit Int	R/W	03, 06, 16
1114	din_stat_6	16 Bit Int	R/W	03, 06, 16
1115	dout_stat_1	16 Bit Int	R/W	03, 06, 16

Holding Register (Basis 4xxxx)

Reg. no.	Description	Data type	Access	Modbus function
	bit 7-0 function 0 - off 1 - Y 2 - Alarm (1-6) 3 - DI1 4 - Hd 5 - Ys 6 - Ww 7 - PRG 8 - FLG bit 8 - 0-dir, 1-rev 9 - cooling on 10 - heating on			
1116	dout_stat_2	16 Bit Int	R/W	03, 06, 16
1117	dout_stat_3	16 Bit Int	R/W	03, 06, 16
1118	dout_stat_4	16 Bit Int	R/W	03, 06, 16
1119	dout_stat_5	16 Bit Int	R/W	03, 06, 16
1120	dout_stat_6	16 Bit Int	R/W	03, 06, 16
1121	dout_rng_beg_1	16 Bit Int	R/W	03, 06, 16
1122	dout_rng_beg_2	16 Bit Int	R/W	03, 06, 16
1123	dout_rng_beg_3	16 Bit Int	R/W	03, 06, 16
1124	dout_rng_beg_4	16 Bit Int	R/W	03, 06, 16
1125	dout_rng_beg_5	16 Bit Int	R/W	03, 06, 16
1126	dout_rng_beg_6	16 Bit Int	R/W	03, 06, 16
1127	dout_rng_end_1	16 Bit Int	R/W	03, 06, 16
1128	dout_rng_end_2	16 Bit Int	R/W	03, 06, 16
1129	dout_rng_end_3	16 Bit Int	R/W	03, 06, 16
1130	dout_rng_end_4	16 Bit Int	R/W	03, 06, 16
1131	dout_rng_end_5	16 Bit Int	R/W	03, 06, 16
1132	dout_rng_end_6	16 Bit Int	R/W	03, 06, 16
1133	dout_tcyc_1	16 Bit Int	R/W	03, 06, 16
1134	dout_tcyc_2	16 Bit Int	R/W	03, 06, 16
1135	dout_tcyc_3	16 Bit Int	R/W	03, 06, 16
1136	dout_tcyc_4	16 Bit Int	R/W	03, 06, 16
1137	dout_tcyc_5	16 Bit Int	R/W	03, 06, 16
1138	dout_tcyc_6	16 Bit Int	R/W	03, 06, 16
1139	aout_i_beg_1	16 Bit Int	R/W	03, 06, 16
1140	aout_i_beg_2	16 Bit Int	R/W	03, 06, 16
1141	aout_i_end_1	16 Bit Int	R/W	03, 06, 16
1142	aout_i_end_2	16 Bit Int	R/W	03, 06, 16
1143	sp_ext_stat b7-b0 external setpoint 1 0 - off, 1 - Ain1, 2 - ain2, 3 - ain3 b15-b8 external sp 2 0 - off, 1 - Ain1, 2 - ain2, 3 - ain3	16 Bit Int	R/W	03, 06, 16
1144	out_ext_stat 0 - off, 1 - Ain1, 2 - ain2, 3 - ain3	16 Bit Int	R/W	03, 06, 16
1145	ctrl_type 0 - FWR 1 - VHT 2 - DIFF 3 - LTG 4 - CAS 5 - 2REG	16 Bit Int	R/W	03, 06, 16
1146	y0_mode 0 - SET (parameter) 1 - AUT (auto) 2 - W	16 Bit Int	R/W	03, 06, 16

Reg. no.	Description	Data type	Access	Modbus function	
1147	lang_mode	16 Bit Int	R/W	03, 06, 16	
1148	dsp_phys_mode_1 0-Percent, 1-Phy	16 Bit Int	R/W	03, 06, 16	
1149	dsp_phys_mode_2	16 Bit Int	R/W	03, 06, 16	
1150	2 REG 0-min, 1-max, 2-2al	16 Bit Int	R/W	03, 06, 16	
1151	Störgröße input 0-off, 1-Ain1, 2-Ain2, 3 - Ain3	16 Bit Int	R/W	03, 06, 16	
1152	Start condition 0-Yan, 1-LastY	16 Bit Int	R/W	03, 06, 16	
1153	Ramp time 0- '0-100', 1-Delta W	16 Bit Int	R/W	03, 06, 16	
1154	Ramp time base b7-b0: 0-sec, 1-min b15-b8: Ramp interrupt on hand 0n/off 0-off	16 Bit Int	R/W	03, 06, 16	
1155	S_Begr 0-Off, 1-Ai1,2-Ai2,3-Ai3	16 Bit Int	R/W	03, 06, 16	
1156	S_Err 0:X-X, 1:W-X	16 Bit Int	R/W	03, 06, 16	
1157	S_Fub b3-b0: Fub 1 0-off, 1-on b7-b4: Fub 2 b12-b8: Fub 3	16 Bit Int	R/W	03, 06, 16	
1158	S-Input b7-b0 input 1 0 – Ain1 1 – Ain2 2 – Ain3 3 - Din (ain1/Ain2)	b15-b8 input 2 0 - Ain1 1 - Ain2 2 - Ain3	16 Bit Int	R/W	03, 06, 16
1159	S_Y_AE 0-H+A, 1-A (Y-Limit in 'Hand')	16 Bit Int	R/W	03, 06, 16	
1160	S_TRAC b7-b0 Trac X b15-b8 Trac W 0-Off,1 on	16 Bit Int	R/W	03, 06, 16	
1161	S_DSET 0-off, 1-on	16 Bit Int	R/W	03, 06, 16	
1162	S_INSW (prev:SPF) 0-off, 1-W, 2-P, 3-W+P	16 Bit Int	R/W	03, 06, 16	
1163	S_IRES 0-off, 1-on	16 Bit Int	R/W	03, 06, 16	
1164	S_LIN 0-off, 1-ain1, 2-ain2, 3 ain3	16 Bit Int	R/W	03, 06, 16	
1165	S_CASB 0-MY, 1-SY, 2-MW	16 Bit Int	R/W	03, 06, 16	
1166	S_COM b7-b0 Address, b9,b8: Baud, B12-Prot	16 Bit Int	R/W	03, 06, 16	
1167	code_manual	16 Bit Int	R/W	03, 06, 16	
1168	code_param	16 Bit Int	R/W	03, 06, 16	
1169	code_stru	16 Bit Int	R/W	03, 06, 16	
1170	code_calib	16 Bit Int	R/W	03, 06, 16	
1171	code_prg	16 Bit Int	R/W	03, 06, 16	
1172	code_ltg	16 Bit Int	R/W	03, 06, 16	
1173		16 Bit Int	R/W	03, 06, 16	
1174		16 Bit Int	R/W	03, 06, 16	
1175	cal_ain1_0	16 Bit Int	R/W	03, 06, 16	
1176	cal_ain1_100	16 Bit Int	R/W	03, 06, 16	
1177	cal_ain2_0	16 Bit Int	R/W	03, 06, 16	
1178	cal_ain2_100	16 Bit Int	R/W	03, 06, 16	
1179	cal_ain3_0	16 Bit Int	R/W	03, 06, 16	
1180	cal_ain3_100	16 Bit Int	R/W	03, 06, 16	

Holding Register (Basis 4xxxx)

Reg. no.	Description	Data type	Access	Modbus function
1181	cal_out1_0	16 Bit Int	R/W	03, 06, 16
1182	cal_out1_100	16 Bit Int	R/W	03, 06, 16
1183	cal_out2_0	16 Bit Int	R/W	03, 06, 16
1184	cal_out2_100	16 Bit Int	R/W	03, 06, 16
1185	PT100 lin (on/off) b0 - Ain1,b1-ain2,b2-ain3	16 Bit Int	R/W	03, 06, 16
1186	alarm_r_gradx	16 Bit Int	R/W	03, 06, 16
1187	alarm_hy_gradx	16 Bit Int	R/W	03, 06, 16
1188	alarm_r_dy	16 Bit Int	R/W	03, 06, 16
1189	alarm_hy_dy	16 Bit Int	R/W	03, 06, 16
1190	alarm_r_dx	16 Bit Int	R/W	03, 06, 16
1191	S_I_SW 0 - off,1-par1,2-par2,3-par3	16 Bit Int	R/W	03, 06, 16
1192	lin-10%	16 Bit Int	R/W	03, 06, 16
1193	lin-5%	16 Bit Int	R/W	03, 06, 16
1194	lin0%	16 Bit Int	R/W	03, 06, 16
1195	lin5%	16 Bit Int	R/W	03, 06, 16
...				
1212	lin95%	16 Bit Int	R/W	03, 06, 16
1213	lin100%	16 Bit Int	R/W	03, 06, 16
1214	lin105%	16 Bit Int	R/W	03, 06, 16
1215	lin110%	16 Bit Int	R/W	03, 06, 16
1216				
1217				
1218				
1219				
1220	PRG			
...				
1409	cool_delay	16 Bit Int	R/W	03, 06, 16
1410	heat_delay	16 Bit Int	R/W	03, 06, 16
1411	LTG	16 Bit Int	R/W	03, 06, 16
1412	User level flag	16 Bit Int	R/W	03, 06, 16
...				
1420	usel level flag	16 Bit Int	R/W	03, 06, 16
1421	Device number	16 Bit Int	R/W	03, 06, 16