


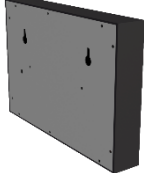

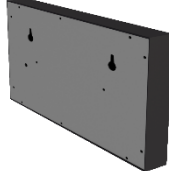

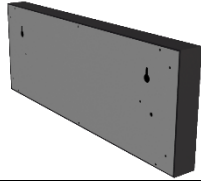

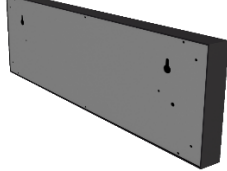

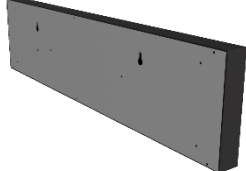

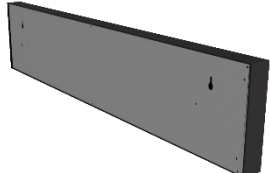

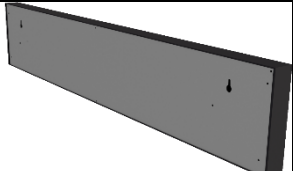


D200 LED display with 200mm segments RED, GREEN

	From the front	From the rear
Name: D2001 Dimensions: 188 x 243 x 33 [mm] Weight: 1 kg Power: 20 - 26V DC / 8W		
Name: D2002 Dimensions: 355 x 243 x 33 [mm] Weight: 2.0 kg Power: 20 - 26V DC / 12 W		
Name: D2003 Dimensions: 522 x 243 x 33 [mm] Weight: 3 kg Power: 20 - 26V DC / 16 W		
Name: D2004 Dimensions: 689 x 243 x 33 [mm] Weight: 4.0 kg Power: 20 - 26V DC / 20 W		
Name: D2005 Dimensions: 856 x 243 x 33 [mm] Weight: 5.0 kg Power: 20 - 26V DC / 24 W		
Name: D2006 Dimensions: 1023 x 243 x 33 [mm] Weight: 6.0 kg Power: 20 - 26V DC / 28 W		
Name: D2007 Dimensions: 1190 x 243 x 33 [mm] Weight: 7.0 kg Power: 20 - 26V DC / 32 W		
Name: D2008 Dimensions: 1357 x 243 x 33 [mm] Weight: 8.0 kg Power: 20 - 26V DC / 36 W		

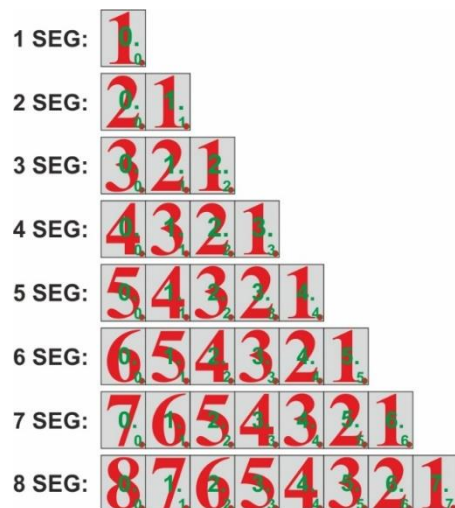
Option: Optional cover color, Ethernet connection, control via binary inputs, control via Wifi, control via Radio 869Mhz, user program.

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1. Design

Name	HWS version	Comment
D2001	D2001*	
D2002	D2002*	
D2003	D2003*	
D2004	D2004*	
D2005	D2005*	
D2006	D2006*	
D2007	D2007*	
D2008	D2008*	
D200x	D200x*	Reserve



2. Hardware

2.1 Hardware parameters	
Segment	LED 200 mm height
Working temperature	-20°C +50°C
Working humidity	10 ÷ 90% Rh
Power	20 - 26V DC from 8W (1 segment) to 36W (8 segments)
Interface	Isolated RS485 – Modbus RTU
Comm. Speed	9600 or 115200 Bd
Design	Interior, IP44
Setup	Via software Bootloader or via ModBus directly

2.2 Setup parameters, shown after Reset on the 0. and 1. segment					
Example for display with 4 segment					
	Displayed			Comment	
1.	0. 0.	1. 1.	2. 2.	3. 3.	Address in hex. 70h = 112 dec
2.	0. 0.	1. 1.	2. 2.	3. 3.	Communication speed. 0 – 9600 1 – 115200
3.	0. 0.	1. 1.	2. 2.	3. 3.	Communication protocol. 4 – Modbus RTU

2.3 Parameters after RESET to RS485		
	Parameters	Comment
1. row	112:RESET=4<cr><lf>	112 – address, 4 – Communication protocol

3. Wiring, standard cable length: 2m

3.1 Wire colour	Comment
Green	Ground
White	15 - 26V DC
Yellow	RS485 +
Brown	RS485 -

4. ModBus RTU communication protocol

4.1 Command 0x10 Write Multiple registers			
Register	Register name	Description	Notes
0	Luminosity and Dot	0000 LLLL 0000 DDDD	♦
1	0.1.	0. segment, 1. segment	ASCII
2	2.3.	2. segment, 3. segment	ASCII
3	4.5.	4. segment, 5. segment	ASCII
4	6.7.	5. segment, 7. segment	ASCII

♦ LLLL (Luminosity): from 0 to 9; 0 – display blank. DDDD (place of DOT): 0 – 7. If DDDD is 0x0f, the DOT is not displayed

4.2 Command 0x06 Write Registers			
Register	Register name	Description	Unit
100	Address	1 – 247	
101	Comm. speed	0 – 115200, 1 - 9600	Bd
107	Comm. Protocol	1 - INGSIMON 2 – HTML,3 - MODBUS ASCII 4 – MODBUS RTU 5 – MODBUS TCP	

4.3 Command 0x03 Read Configuration Registers			
Register	Register name	Description	Units/Notes
100	Address	1 – 247	
101	Communication speed	0 – 115200, 1 - 9600	Bd

102	HWS version 0	Read Only	D2
103	HWS version 1	Read Only	00
104	HWS version 2	Read Only	4*
105	HWS version 3	Read Only	:1
106	HWS version 4	Read Only	.0
107	Comm. Protocol		4 – Modbus RTU

4.4 Default parameters		
Parameter	Value	Comment
Address	0x70h (112d)	
Communication speed	115200, N, 8,1	
Communication protocol	0x04	MODBUS RTU

4.5 Range of addresses	
Address [dec]	Comment
1 - 247	For sensors
248 - 254	Reserve
255	Universal address – used only to read registers, Writing to registers does not work with this address

5. Examples for Modbus RTU

Example 5.1

Set the communication speed from 115200 Bd to 9600 Bd for Address 0x70 (112 dec)		
Poll	70 06 00 65 00 01 52 F4	Response with 115200 Bd. In next communication will use 9600 Bd
Response	70 06 00 65 00 01 52 F4	

Example 5.2

Set the communication speed from 9600 Bd to 115200 Bd for Address 0x70 (112 dec)		
Poll	70 06 00 65 00 00 93 34	Response with 9600 Bd. In next communication will use 115200 Bd
Response	70 06 00 65 00 00 93 34	

Example 5.3

Read 8 registers from 100 from Address 0x70 (112 dec)		
Poll	70 03 00 64 00 08 0F 32	
Response	70 03 10 00 70 00 00 44 32 30 30 34 2A 3A 31 2E 30 00 04 5A A3	
Meaning:		
Byte [hex]	Description	Comment
70	Address	
03	function code	Read holding register
10	count of bytes (16 dec)	
00 70	Address	
00 01	communication speed	9600 Bd
44 32	D2	D2
30 30	00	00
34 2A	4*	4* - reserve
3A 31	:1	
2E 30	.0	
00 04	communication protocol	4 - MODBUS RTU
5A A3	Checksum	

Example 5.4

Getting the current address from display with an unknow address using universal address 0xff Be aware, that only 1 equipment can be connected to the Modbus network.		
Poll	FF 03 00 64 00 01 D0 0B	Read register 100
Response	FF 03 02 00 70 90 74	70 – equipment’s address

Example 5.5

How to set the address. We want to change the address from 70h to 1h. Be aware, that only 1 equipment can be connected to the Modbus network.		
Poll	70 06 00 64 00 01 03 34	Write to register 100 value 1
Response	70 06 00 64 00 01 03 34	01 – equipment’s new address
The next communication with the equipment will be at address 1		

Example 5.6

Changing the address from 1h to 2h. Be aware, that only 1 equipment can be connected to the Modbus network.		
Poll	01 06 00 64 00 02 49 D4	Write to the register 100 value 2
Response	01 06 00 64 00 02 49 D4	02 – equipment’s new address
The next communication with the equipment will be at address 2		

Example 5.7

How to show 12.34 on the display D2004. Address: 0x70. Luminosity:3, Place of decimal point: 1		
Poll	70 10 00 00 00 03 06 03 01 31 32 33 34 dc d6	
Response	70 10 00 00 00 03 8a e9	

Example 5.8

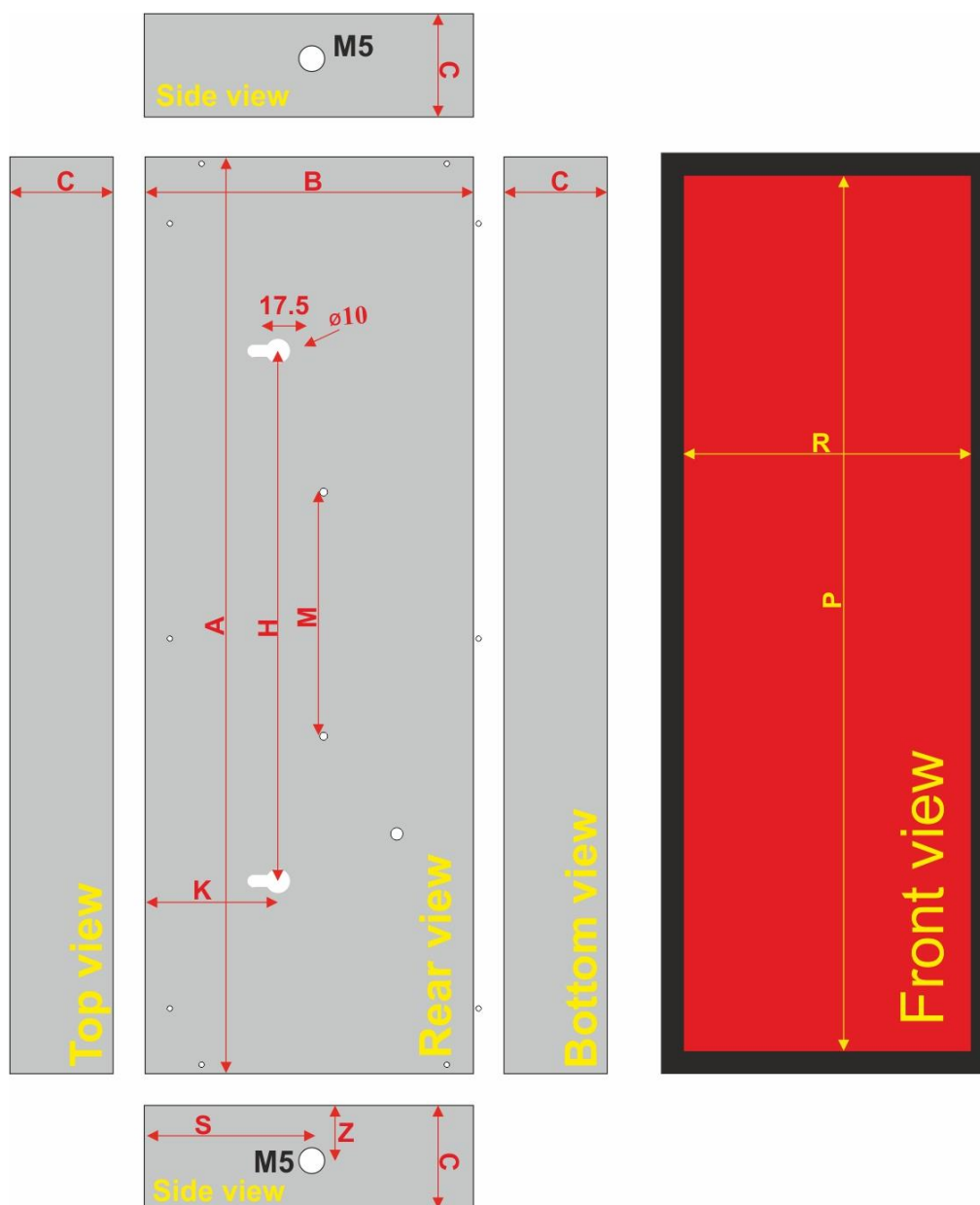
How to show 12.34 on the display D2004. CRC (dc d6) is replaced with universal CRC (XX) for test. It is possible to test from the serial terminal. Address: 0x70. Luminosity:3, Place of decimal point: 1		
Poll	70 10 00 00 00 03 06 03 01 31 32 33 34 58 58	
Response	70 10 00 00 00 03 8a e9	

Example 5.9

How to show 123.45678 on the display D2008. Address: 0x70. Luminosity:4, Place of decimal point: 2		
Poll	70 10 00 00 00 05 0a 04 02 31 32 33 34 35 36 37 38 b0 3a	
Response	70 10 00 00 00 05 0a eb	

6. Dimensions

Segment	A	B	C	D	E	F	H	K	M	S	Z	R	P
1	164	219	33				80	48		70	15	243	188
2	331	219	33				200	48		70	15	243	355
3	498	219	33				350	48		70	15	243	522
4	665	219	33				400	48		70	15	243	689
5	832	219	33				550	48		70	15	243	856
6	999	219	33				700	48		70	15	243	1023
7	1166	219	33				850	48		70	15	243	1190
8	1333	219	33				1100	48		70	15	243	1357



7. Displayed characters

0 - H				I - Z				Special			
	Dec	Hex	Disp.		Dec	Hex	Disp.		Dec	Hex	Disp.
0	48	30		I	73	49		SPACE	32	20	
1	49	31		J	74	4A		-	45	2D	
2	50	32		K	75	4B		TOPC	128	80	
3	51	33		L	76	4C		BOTC	129	81	
4	52	34		M	77	4D		D0	130	82	
5	53	35		N	78	4E		D1	131	83	
6	54	36		O	79	4F		D2	132	84	
7	55	37		P	80	50		D3	133	85	
8	56	38		Q	81	51		D4	134	86	
9	57	39		R	82	52		D5	135	87	
A	65	41		S	83	53		D6	136	88	
B	66	42		T	84	54		D7	137	89	
C	67	43		U	85	55					
D	68	44		V	86	56					
E	69	45		W	87	57					
F	70	46		X	88	58					
G	71	47		Y	89	59					
H	72	48		Z	90	5A					