


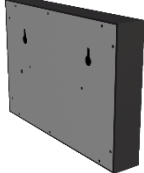

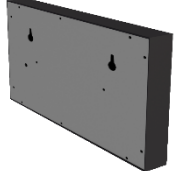

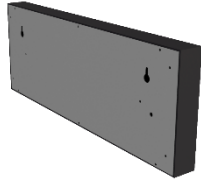

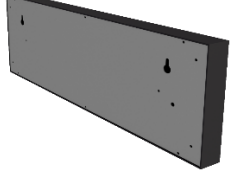

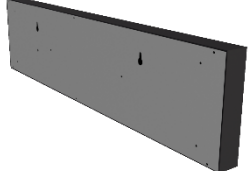

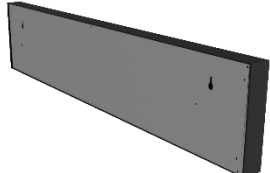

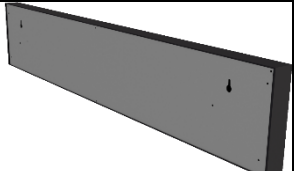


## D56 LED display with 56 mm segments RED, GREEN

	From the front	From the rear
<b>Name:</b> D56_1 <b>Dimensions:</b> 83 x 87 x 24 [mm] <b>Weight:</b> 0.3 kg <b>Power:</b> 12 - 26V DC / 1W		
<b>Name:</b> D56_2 <b>Dimensions:</b> 115 x 87 x 24 [mm] <b>Weight:</b> 0.4 kg <b>Power:</b> 12 - 26V DC / 2 W		
<b>Name:</b> D56_3 <b>Dimensions:</b> 164 x 87 x 24 [mm] <b>Weight:</b> 0.6 kg <b>Power:</b> 12 - 26V DC / 3 W		
<b>Name:</b> D56_4 <b>Dimensions:</b> 212 x 87 x 24 [mm] <b>Weight:</b> 0.8 kg <b>Power:</b> 12 - 26V DC / 4 W		
<b>Name:</b> D56_5 <b>Dimensions:</b> 261 x 87 x 24 [mm] <b>Weight:</b> 1.0 kg <b>Power:</b> 12 - 26V DC / 5 W		
<b>Name:</b> D56_6 <b>Dimensions:</b> 309 x 87 x 24 [mm] <b>Weight:</b> 1.2 kg <b>Power:</b> 12 - 26V DC / 6 W		
<b>Name:</b> D56_7 <b>Dimensions:</b> 358 x 87 x 24 [mm] <b>Weight:</b> 1.4 kg <b>Power:</b> 12 - 26V DC / 7 W		
<b>Name:</b> D56_8 <b>Dimensions:</b> 748 x 87 x 33 [mm] <b>Weight:</b> 1.6 kg <b>Power:</b> 12 - 26V DC / 8 W		

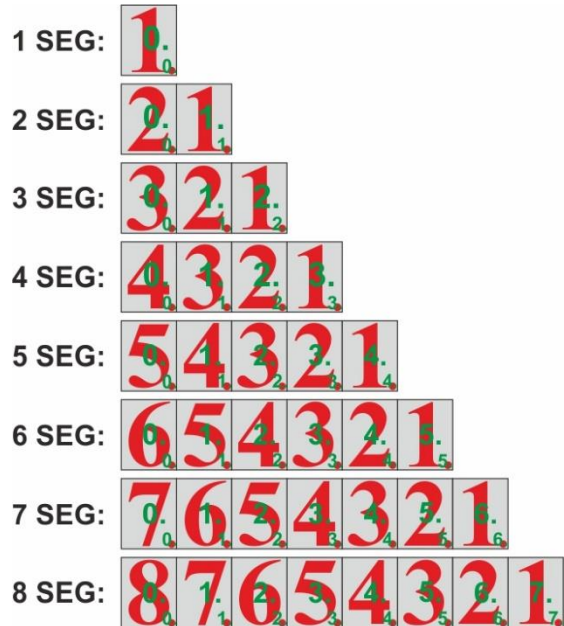
**Option: Optional cover color, Ethernet connection, control via binary inputs, control via Wifi, control via Radio 869Mhz, user program.**

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## 1. Design

Name	HWS version	Comment
D56_1	D56_1*	
D56_2	D56_2*	
D56_3	D56_3*	
D56_4	D56_4*	
D56_5	D56_5*	
D56_6	D56_6*	
D56_7	D56_7*	
D56_8	D56_8*	
D56_x	D56_x*	Reserve



## 2. Hardware

2.1 Hardware parameters	
Segment	LED RED, 56 mm height
Working temperature	-20°C +50°C
Working humidity	10 ÷ 90% Rh
Power	15 - 26V DC from 1W (1 segment) to 10W (8 segments)
Interface	Isolated RS485 – Modbus RTU
Comm. Speed	9600 or 115200 Bd
Dimension	Height = 87 mm, Depth = 24 mm
Width	1 : 83, 2 : 115, 3 : 164, 4 : 212, 5 : 261, 6 : 309, 7 : 358, 8 : 406
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.		Address in hex. 70h = 112 dec
2.		Communication speed. 0 – 9600 1 – 115200
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

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 Number	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 Number	Register name	Description	Units/Notes
100	Address	1 – 247	
101	Communication 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 Number	Register name	Description	Units/Notes
100	Address	1 – 247	
101	Communication speed	0 – 115200, 1 - 9600	Bd
102	HWS version 0	Read Only	D5
103	HWS version 1	Read Only	6_
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 address	
Addresses [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 35 36 5F 34 2A 3A 31 2E 30 00 04 49 3A	
Meaning:		
Byte [hex]	Description	Comment
70	Address	
03	function code	Read holding register
10	count of bytes (16 dec)	
00 70	Address	
00 00	communication speed	115200 Bd
44 35	D5	D5
36 5F	6_	6_
34 2A	4*	4* - reserve
3A 31	:1	
2E 30	.0	
00 04	communication protocol	4 - MODBUS RTU
49 3A	Checksum	

### Example 5.4

How to get the address from display with an unknow address using universal address 0xff <b>Be aware, that only 1 equipment can be connected to the Modbus network.</b>		
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**

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

**Example 5.6**

<b>How to set the address. We want to change the address from 1h to 2h.</b>		
<b>Be aware, that only 1 equipment can be connected to the Modbus network.</b>		
<b>Poll</b>	<b>01 06 00 64 00 02 49 D4</b>	<b>Write to the register 100 value 2</b>
<b>Response</b>	<b>01 06 00 64 00 02 49 D4</b>	<b>02 – equipment’s address</b>
<b>The next communication with the equipment will be at address 2</b>		

**Example 5.7**

<b>How to show 12.34 on the display D56_4.</b>		
<b>Address: 0x70. Luminosity:3, Place of decimal point: 1</b>		
<b>Poll</b>	<b>70 10 00 00 00 03 06 03 01 31 32 33 34 dc d6</b>	
<b>Response</b>	<b>70 10 00 00 00 03 8a e9</b>	

**Example 5.8**

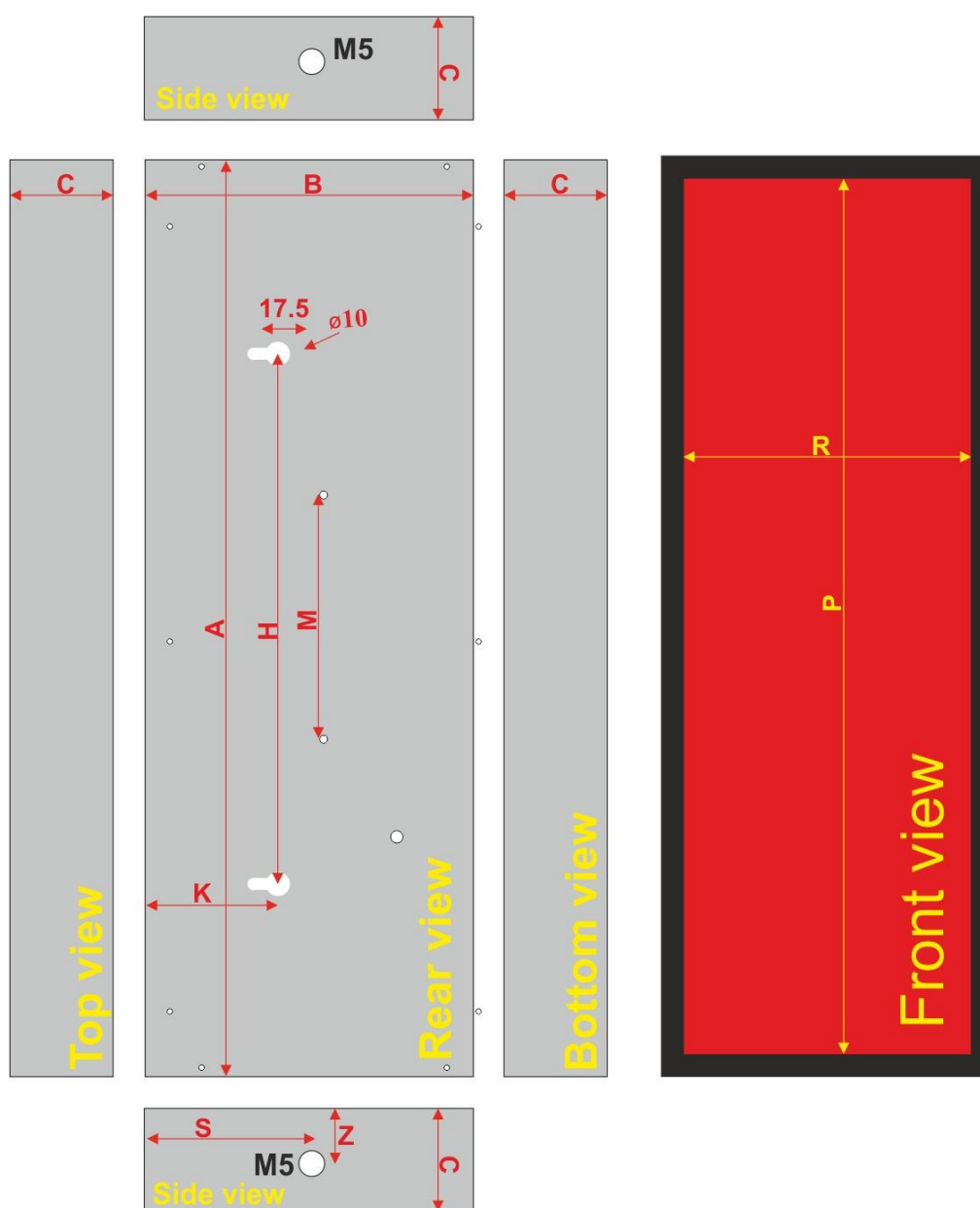
<b>How to show 12.34 on the display D56_4. CRC (dc d6) is replaced with universal CRC (XX) for test. It is possible to test from the serial terminal.</b>		
<b>Address: 0x70. Luminosity:3, Place of decimal point: 1</b>		
<b>Poll</b>	<b>70 10 00 00 00 03 06 03 01 31 32 33 34 58 58</b>	
<b>Response</b>	<b>70 10 00 00 00 03 8a e9</b>	

**Example 5.9**

<b>How to show 123.45678 on the display D56_8.</b>		
<b>Address: 0x70. Luminosity:4, Place of decimal point: 2</b>		
<b>Poll</b>	<b>70 10 00 00 00 05 0a 04 02 31 32 33 34 35 36 37 38 b0 3a</b>	
<b>Response</b>	<b>70 10 00 00 00 05 0a eb</b>	

## 6. Dimensions

Segment	A	B	C	D	E	F	H	K	M	S	Z	R	P
1	83	87	24				50	23		55	15	67	48
2	115	87	24				80	23		55	15	67	95
3	164	87	24				100	23		55	15	67	144
4	212	87	24				100	23		55	15	67	192
5	261	87	24				100	23		55	15	67	241
6	309	87	24				200	23		55	15	67	289
7	358	87	24				200	23		55	15	67	338
8	406	87	24				200	23		55	15	67	386



## 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					