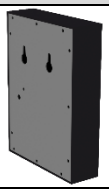
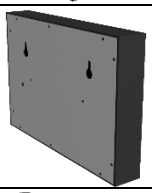
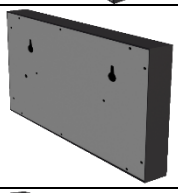
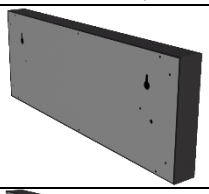
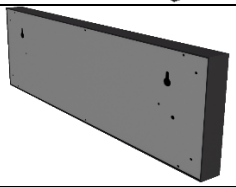
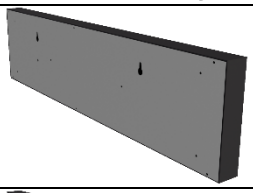
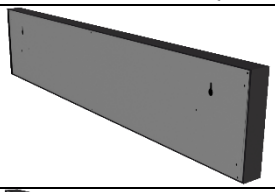
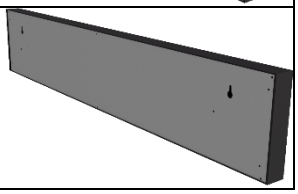
D100 LED display with 100mm segments
RED, GREEN, RGB

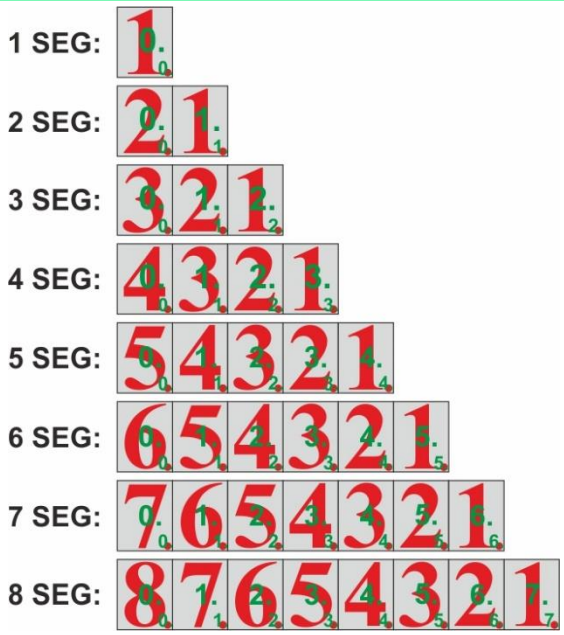
	From the front	From the rear
Name: D1001 **Dimensions:** 111 x 130 x 33 [mm] **Weight:** 0.5 kg **Power:** 15 - 26V DC / 2W		
Name: D1002 **Dimensions:** 202 x 130 x 33 [mm] **Weight:** 1.0 kg **Power:** 15 - 26V DC / 4 W		
Name: D1003 **Dimensions:** 293 x 130 x 33 [mm] **Weight:** 1.5 kg **Power:** 15 - 26V DC / 6 W		
Name: D1004 **Dimensions:** 384 x 130 x 33 [mm] **Weight:** 2.0 kg **Power:** 15 - 26V DC / 8 W		
Name: D1005 **Dimensions:** 475 x 130 x 33 [mm] **Weight:** 2.5 kg **Power:** 15 - 26V DC / 10 W		
Name: D1006 **Dimensions:** 566 x 130 x 33 [mm] **Weight:** 3.0 kg **Power:** 15 - 26V DC / 12 W		
Name: D1007 **Dimensions:** 657 x 130 x 33 [mm] **Weight:** 3.5 kg **Power:** 15 - 26V DC / 14 W		
Name: D1008 **Dimensions:** 748 x 130 x 33 [mm] **Weight:** 4.0 kg **Power:** 15 - 26V DC / 16 W		

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

Contents:

1. Design

Name	HWS version	Comment
D1001	D1001*	
D1002	D1002*	
D1003	D1003*	
D1004	D1004*	
D1005	D1005*	
D1006	D1006*	
D1007	D1007*	
D1008	D1008*	
D100x	D100x*	Reserve



2. Hardware

2.1 Hardware parameters	
Segment	LED RED, 100 mm height
Working temperature	-20°C +50°C
Working humidity	10 ÷ 90% Rh
Weight	1-0.5 kg, 2-1 kg, 3-1.5 kg, 4-2 kg, 5-2.5 kg, 6-3 kg, 7-3.5 kg, 8-4 kg
Power	15 - 26V DC from 2W (1 segment) to 20W (8 segments)
Interface	Isolated RS485 – Modbus RTU
Comm. Speed	9600 or 115200 Bd
Dimension	Height = 145 mm, Depth = 34 mm
Width	1 – 114, 2 – 204, 3 – 294, 4 – 384, 5 – 474, 6 – 564, 7 – 654, 8 - 744
Design	Interior, IP44
Setup	Via software Bootloader or via ModBus directly
Firmware upgrade	Via software Bootloader

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		
	Parametre	Poznámka
1. row	112:RESET=4<cr><lf>	112 – address, 4 – Communication protocol

3. Connection, standard cable length: 2m

3.0 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	D1
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 address	
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 01 44 31 30 30 34 2A 3A 31 2E 30 00 04 57 66	
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 31	D1	D1
30 30	00	00
34 2A	4*	4* - reserve
3A 31	:1	
2E 30	.0	
00 04	communication protocol	4 - MODBUS RTU
57 66	CheckSum	

Example 5.4		
How to get the 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

How to set the address. We want to change 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 D1004. **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

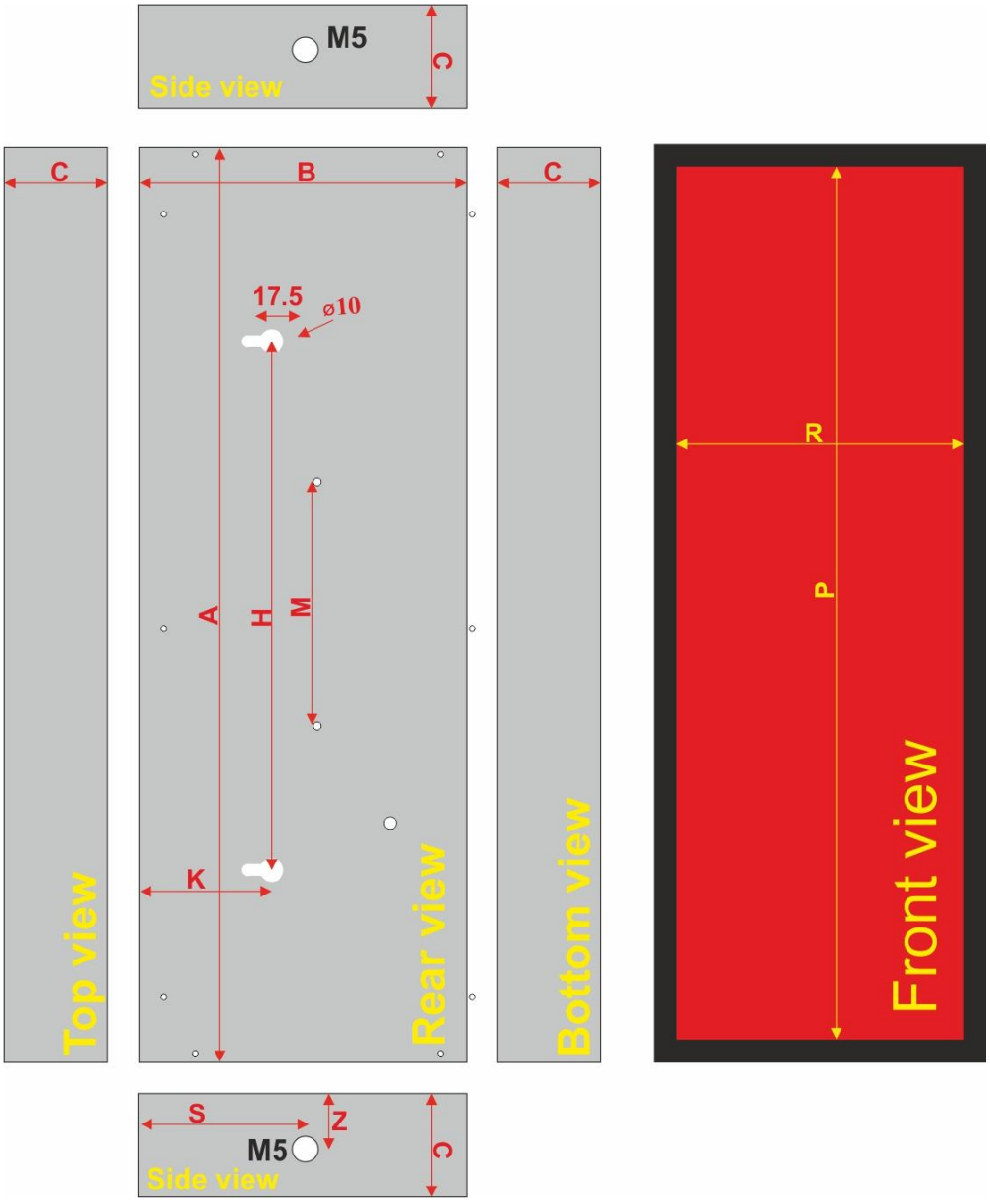
How to show 12.34 on the display D1004. CRC (dc d6) is replaced with universal CRC (XX) for test. It is possible to test from the serial terminal. **Address: 0x70. Luminosity:3, Place of decimal point: 1**		
Poll	70 10 00 00 00 03 06 03 01 31 32 33 34 58 58	
Response	70 10 00 00 00 03 8a e9	

Example 5.9

How to show 123.45678 on the display D1008. **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. Dimension

Segment	A	B	C	D	E	F	H	K	M	S	Z	R	P
1	111	140	32				70	48		70	15	118	86
2	202	140	32				120	48		70	15	118	177
3	293	140	32				120	48		70	15	118	268
4	384	140	32				220	48		70	15	118	359
5	475	140	32				320	48		70	15	118	450
6	566	140	32				320	48		70	15	118	541
7	657	140	32				420	48		70	15	118	632
8	748	140	32				420	48		70	15	118	723



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					