

# migan MPB ModbusTCP

Large Format Numeric LED Display with ModbusTCP Interface

## User manual



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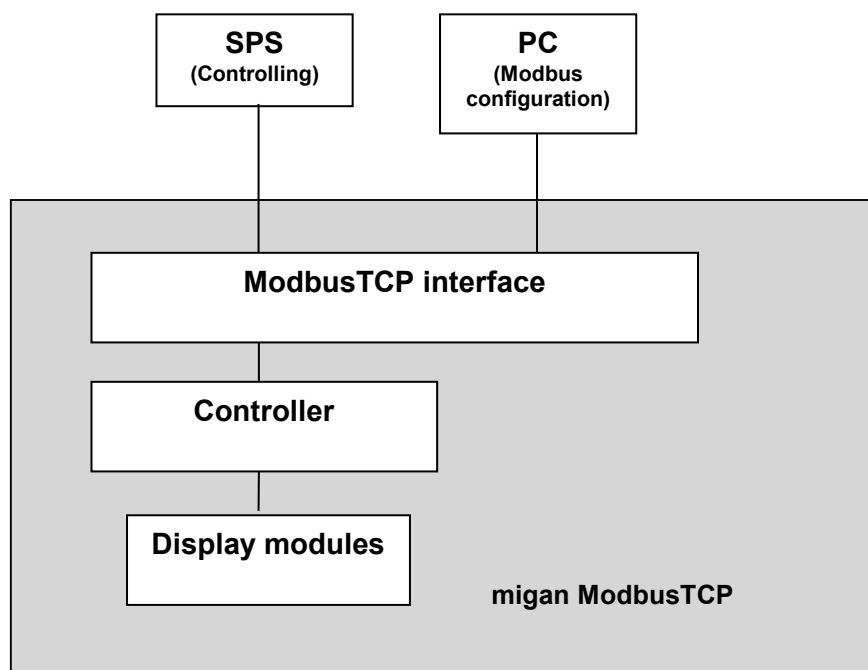
Large Format Numeric LED Display with ModbusTCP Interface

## 1 General

This 7 segment displays are designed for professional use. Depending on the type of device, they are suitable for indoor or outdoor use.

The modular design allows for cost-effective models of various interfaces with different character heights and numbers of digits.

## 2 System Overview



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## 3 Technical Data

Display type:	7 segment LED
Character heights:	Indoor use: 60 / 100 / 150 / 200 / 250 mm Outdoor use: 100 / 200 / 300 mm
Number of digits:	1...100
Number of lines:	Standard 1 line, multiple lines on request
Display colour:	Standard red, other colours on request
Operating voltage:	230 VAC / 50 Hz, 110 VAC / 60 Hz or 24 VDC $\pm 20\%$
View:	Single to four-sided
Interface:	ModbusTCP
Displayable characters:	see corresponding chapter
Labelling:	on request
Housing:	Industrial version, powder coated aluminum
Housing colour:	RAL 7016 (anthracite)
Mounting:	Articulated arm, angle bracket, hanging on chain or mounting frame
Protection:	see chapter "Device Configuration"
Operating temp.:	see chapter "Device Configuration"
Storage temp.:	-25 ... +70 °C

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## 3.1 Device Configuration

**Itemnumber :** \_\_\_\_\_

**Type:**

for inside use                       for outside use

**Character height:**

60 mm     100 mm     150 mm     200 mm     250 mm     300 mm

**Number of lines:** \_\_\_\_\_      **Number of digits per line:** \_\_\_\_\_

**Display colour:**

Red     Green     Yellow     White     Blue

**View:**

single sided                       double sided                       \_\_\_\_\_-sided

**Operating voltage:**

230 VAC / 50 Hz                       110 VAC / 60 Hz                       24 VDC

**Protection:**

IP40     IP54     IP65     IP \_\_\_\_\_

**Operating temperature:**

with type for inside use:	with type for outside use:	Special version:
<input type="checkbox"/> 0...+50 °C (standard)	<input type="checkbox"/> -20...+50 °C (standard)	<input type="checkbox"/> _____ °C
	<input type="checkbox"/> -25...+50 °C (optional with heating)	

**Housing dimensions:** \_\_\_\_\_ x \_\_\_\_\_ x \_\_\_\_\_ mm

**Housing Material:**

Aluminum profile                       Stainless steel                       Sheet metal

**Interface:**

ModbusTCP                       Digital inputs                       Digital outputs  
 USB

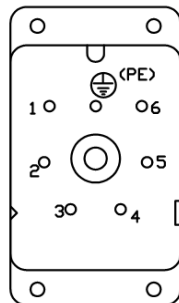
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## 3.2 Connector Pin Assignments

Please see inside labelling of the mating plugs for pin assignment.

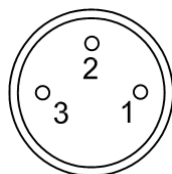
### Power Connector 230 VAC



Pin	Assignment
1	L1
2	N
(PE)	PE

or:

### Power Connector 24 VDC

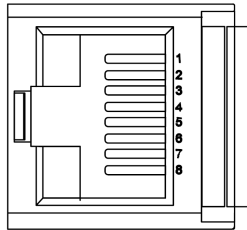


Pin	Assignment
1	GND
2	+24 VDC
3	PE

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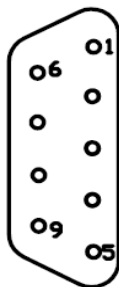
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## Modbus TCP (system interface)



Pin	Assignment
1	Tx +
2	Tx -
3	Rx +
4	
5	
6	Rx -
7	
8	

## Modbus Config (RS232)



Pin	Assignment
1	
2	RxD
3	TxD
4	
5	GND
6	
7	
8	
9	

### 3.3 Start-Up

After power-up the display shows following:

- Segment test

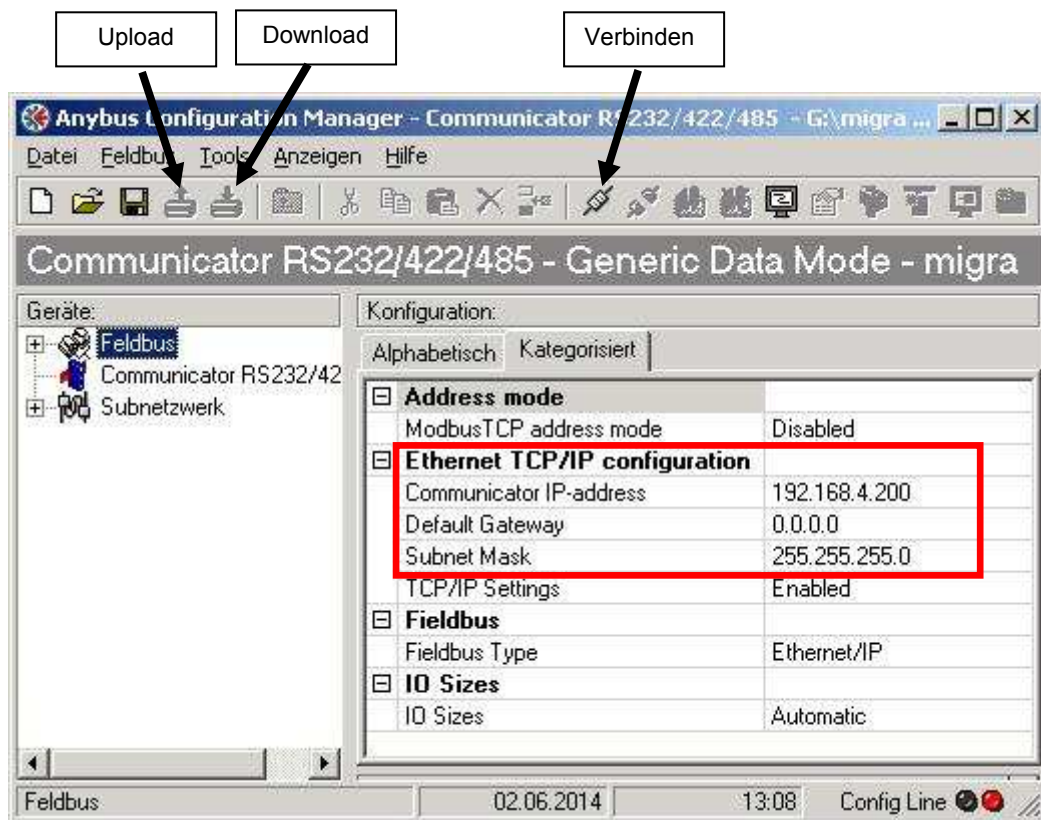
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## 3.4 Modbus Configuration

The software “Anybus Configuration Manager” of the company HMS serves for the configuration of the interface. You can find this tool at the web page of the interface manufacturer [www.anybus.com](http://www.anybus.com) in the area SUPPORT -> Anybus Communicator -> Modbus TCP Serial Gateway.

- Connect the display with a RS232 null modem cable (pins 2<->3, 3<->2, 5<->5) to a PC / Laptop.
- Start the software.
- Close the window “Konfiguration auswählen” with the button “Cancel”.
- Press button “Verbinden” and after that button “Upload”.



- Change **only** the marked fields according to your requirements
- Click button “Download” to transmit the configuration to the interface.
- Now the interface configuration is completed.

You can find the original configuration at our home page [www.microsyst.de](http://www.microsyst.de) in the area “Downloads & Support” -> “migan” -> “Modbus TCP” -> “Configuration File for HMS Interface”.



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## 4 Controlling

### 4.1 Display Output

The transmit-bytes are written as of the address 0x202 into the display interface.

TB	LEN1	ADR	LEN2	O1
Toggle Byte*	Number of following bytes (from ADR to CHK)	Device address	Number of following bytes (from O1 to CHK)	Options
00H...FFH	08H ... n	01H	06H ... n	Bit 7: report software version**  Bit 6: 0 = Statically display the last received data (standard) 1 = Display "----", if no new data is received within 5 s.  Bits 5...4: <u>Brightness</u> 00 = 100% 01 = 80% 10 = 60% 11 = 40%  Bit 3 = Digital output 4 Bit 2 = Digital output 3 Bit 1 = Digital output 2 Bit 0 = Digital output 1  Output will be set, if corresponding bit = 1

\*\* at communication with response frame

\*Toggle byte:

The toggle byte must be increased by 1, if the frame shall be processed.

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<b>O2</b>	
Output format	
Bits 7...4: <u>Physical number of digits (bit coded)</u>	
0001...1111	= 1...15 digits
0000	= ASCII representation with up to 40 digits
Bit 3: <u>Mode</u>	
0	= LSB first
1	= MSB first
Bits 2...0: <u>Data type*</u>	<u>max. number of digits</u>
000	= unsigned CHAR (0...255) 3
001	= unsigned INT (0...65535) 5
010	= unsigned LONG (0...4294967296) 10
011	= signed CHAR (-128...127) 4
100	= signed INT (-32768...32767) 6
101	= signed LONG (-2147483648... 2147483647) 11
110	= ASCII representation 40
111	= reserved
* at value representation: right-aligned display	
at ASCII representation: left-aligned display	

<b>O3</b>	<b>O4</b>
Decimal points	Decimal points, blinking
Bit 7 = Point for digit 1	Bit 7 = Point for digit 9
Bit 6 = Point for digit 2	Bit 6 = Point for digit 10
Bit 5 = Point for digit 3	Bit 5 = Point for digit 11
Bit 4 = Point for digit 4	Bit 4 = Point for digit 12
Bit 3 = Point for digit 5	Bit 3 = Point for digit 13
Bit 2 = Point for digit 6	Bit 2 = Point for digit 14
Bit 1 = Point for digit 7	Bit 1 = Point for digit 15
Bit 0 = Point for digit 8	Bit 0 = Display blinks

A point is set, if corresponding bit = 1

Either the decimal point or the colon can be shown. It depends on the type of display module (ordering option).

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D1...Dn	CHK
Data bytes (value- or ASCII representation)	Checksum
<p><u>Value representation:</u>            CHAR value: 1 byte            INT value: 2 bytes            LONG value: 4 bytes</p> <p><u>ASCII representation (max. 80 bytes):</u>            1 byte per character, max. 40 digits,            Bit 7 = 1: digit blinks</p> <p>The decimal point or colon (ordering option)            has character code 2C<sub>H</sub> or 2E<sub>H</sub> and is always            set at the previous digit.</p>	<p>depending on S4-DIP5:            standard: 55<sub>H</sub> (fixed value)  <u>or</u>            LOW byte of the sum of            the bytes ADR to Dn</p>

**Controlling devices with multiple display areas (e.g. 2 lines):**

The partition from O2...Dn is used repeatedly according to the number of display areas (see example 3).

Please attend to the maximum total frame length of 152 bytes.

**Example 1:**

Display with 4 digits, unsigned INT (LSB first), brightness = 60%, display value = 1.23

TB 09 01 07 20 41 40 00 7B 00 55

**Example 2:**

Display with 4 digits, ASCII representation, brightness = 60%, display value = 12.34

TB 0C 01 0A 20 46 00 00 31 32 2E 33 34 55

**Example 3:**

Display with 2 lines and 4 digits per line, unsigned INT (LSB first),  
 display value for line 1 = 1.23,  
 display value for line 2 = 5.67

TB 0E 01 0C 00 41 40 00 7B 00 41 40 00 37 02 55

\-----/ \-----/  
 Line 1                      Line 2  
 (O2...D2)                    (O2...D2)

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## 4.2 Response Frame (from Display)

A response frame appears in the interface as of address 0x160.

Digital inputs are optionally available (depending on display type).

TB	LEN1	ADR	LEN2	I1	CHK
Toggle byte*	Length	Device address	Length	Digital Input	Checksum
00H...FFH	04H	01H	02H	Bit 7 = Event digital input 4 Bit 6 = Event digital input 3 Bit 5 = Event digital input 2 Bit 4 = Event digital input 1  Bit 3 = Status digital input 4 Bit 2 = Status digital input 3 Bit 1 = Status digital input 2 Bit 0 = Status digital input 1	depending on S4-DIP5:  standard: 55H (fixed value) <b>or</b> LOW byte of the sum of the bytes ADR + LEN2 + I1

### \*Toggle byte:

The toggle byte is increased by 1, if a response frame is received from the display.

**Event** of a digital input = 1, if it has been set at least once since the last query (for example with a button). The event is deleted after every query.

**Status** of a digital input = 1, if it's set at the moment.

### Example

Response frame if digital input 3 is set:

**TB 04 01 02 04 55**

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## 5 Appendix

### 5.1 Displayable Characters

The data bytes are ASCII coded:

Lower ⌘	Higher ⌘	0	1	2	3	4	5	6	7
0				"Blank"	0		P		P
1					1	A	9	A	9
2					2	b	7	b	7
3					3	c	5	c	5
4					4	d	E	d	E
5					5	E	4	E	4
6					6	F		F	
7					7	G		G	
8				C	8	H		H	
9				J	9	I	9	I	9
A						J		J	
B									
C				. / : *		L		L	
D				-					
E				. / : *		n		n	
F						o	-	o	

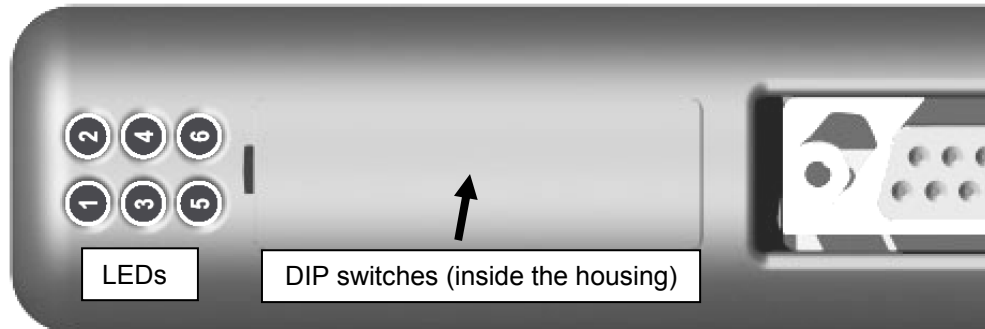
\* Either a decimal point or a colon can be shown.  
It depends on the display module (ordering option).

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## 5.2 Modbus Diagnostics

For diagnostics the housing of the display must be opened.



### LED 1 - Module Status

State	Description
steady off	no supply power
steady green	device operational
flashing green	module has not been configured
flashing red	recoverable fault
steady red	internal error
flashing green/red	self-test

### LED 2 - Network Status

State	Description
steady off	no power or no IP address
steady green	connection to SPS
flashing green	no connection to SPS
flashing red	connection timeout
steady red	duplicate IP address
flashing green/red	self-test

### LED 3 - Link

State	Description
steady green	module has a link
steady off	module does not sense a link

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## LED 4 - Activity

State	Description
flashing green	frame is received or transmitted

## LED 5 - Subnet Status (RS485)

State	Description
steady off	power off
flashing green	initializing and not running
steady green	running
steady red	stopped, subnet error or timeout

## LED 6 - Device Status

State	Description
steady off	power off
flashing red/green	invalid or missing configuration
steady green	initializing
flashing green	running
flashing red	error code

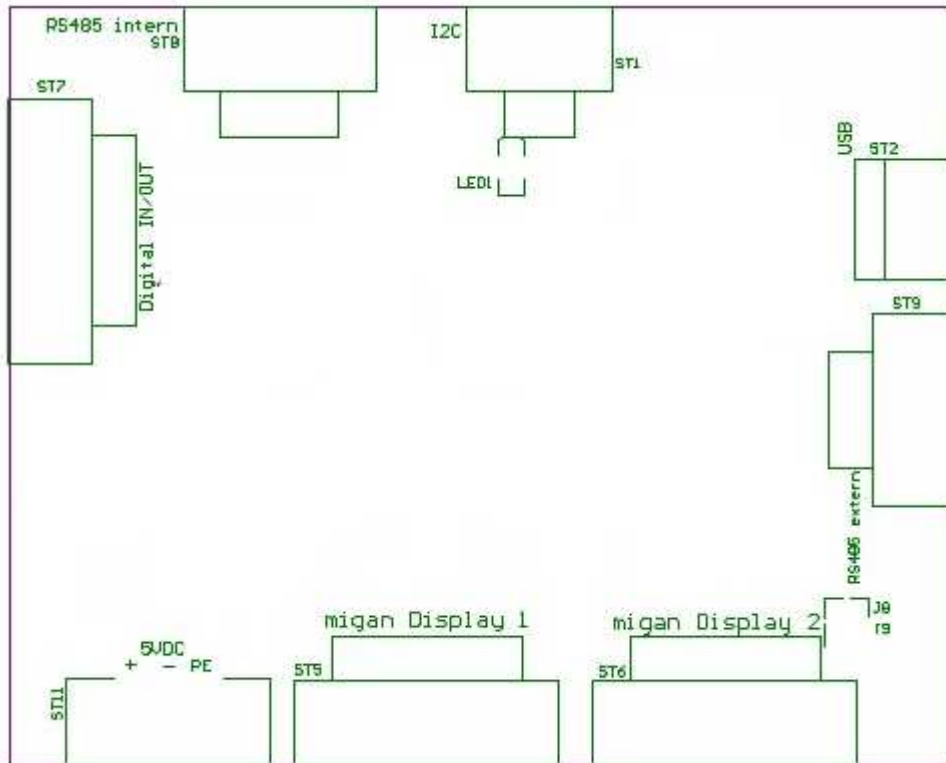
## DIP Switches

All DIP switches must be switched off.

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## 5.3 Factory Settings



## LED

LED	Function / Description
LED 1 (green)	Power-up: Blinks at a frequency of approx. 2,5 Hz Normal operation: Blinks at a frequency of approx. 5 Hz Boot mode: Blinks at a frequency of approx. 0,5 Hz Software upload: Flickers during the upload Configuration: Defective MKS: Blinks with an Error Code: 1x

**Interface Parameters will be set bei software (MKS)**



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## 5.4 General Notes

Please observe the following instructions:

- When installing the device, always make sure that the installed housing can be opened for adjustment or maintenance work. When attaching the device, leave an appropriate space on the back / front / top to ensure adequate ventilation (if available).
- Direct exposure to light sources or direct sun rays reduces the reading quality.
- Turn the device off for cleaning.
- Protect the device from excessive moisture, strong vibrations, direct sun exposure and extreme temperatures. If this is not observed, it can cause function problems or device destruction. In addition, there is the danger of electric shock, fire or explosion. Please refer to "Technical Information" chapter for detailed information regarding proper ambient conditions, especially recommended temperature ranges.
- The device may not be used if there is any damage on the device and / or power line.
- Do not attempt to repair the device yourself. Any interference by unauthorized personnel will void the warranty.

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## 5.5 Declaration of Conformity

### EU-Konformitätserklärung *EU Declaration of Conformity*

**Produktbezeichnung:** migan  
*Product name:*

**Typenreihe:** migan ModbusTCP  
*Type code:*

**Hersteller:** microSYST Systemelectronic GmbH  
*Manufacturer:* Am Gewerbepark 11  
92670 Windischeschenbach

<p><b>Das bezeichnete Produkt stimmt mit der folgenden Europäischen Richtlinie überein:</b> <i>We herewith confirm that the above mentioned product meets the requirements of the following standard:</i></p>		<p><b>Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der angewandten Richtlinie(n) wird nachgewiesen durch die Einhaltung folgender Normen / Vorschriften:</b> <i>The conformity of the product described above with the provisions of the applied Directive(s) is demonstrated by compliance with the following standards / regulations:</i></p>
<b>Richtlinien / Directives</b>		<b>Europäische Norm / Standard</b>
<p><b>EMV Richtlinie</b> <i>EMC Directive</i></p>	<p><b>2014/30/EU</b></p>	EN61000-6-2:2005
		EN61000-6-4:2007 +A1:2011
<p><b>Niederspannungs-Richtlinie</b> <i>Low Voltage Directive</i></p>	<p><b>2014/35/EU</b></p>	EN60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013
<p><b>RoHS Richtlinie</b> <i>RoHS Directive</i></p>	<p><b>2011/65/EU</b></p>	EN50581:2012

Windischeschenbach, 16.11.2017



Manuel Raß

**Geschäftsführer / General Manager**

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## 5.6 Warranty / Liability

For the product, liability is assumed for defects, which existed at the delivery date according to our General Terms and Conditions.

Technically changes as well as errors are accepted. A claim for delivery of a new product does not exist. The buyer has to check the received product immediately and indicate evident defects at the latest 24 hours after detection. Non-observance of notification requirements is equated with acceptance of the defect. Not immediately visible defects have to be indicated immediately after their perception too.

Generally, defects and their symptoms must be described as accurately as possible in order to allow for reproducibility and elimination. The buyer must provide for access to the relevant device and all required and/or useful information at no charge and must make all of the required data and machine time available free of charge.

The guarantee does not cover defects, which result from non-observance of the prescribed conditions of use, or from improper handling.

If the device has been placed at the disposal of the buyer for test purposes and has been purchased subsequent to such testing, both parties agree that the product is to be considered “used” and that it has been purchased “as is”. No guarantee claims may be made in such cases.

The General Terms and Conditions of microSYST Systemelectronic GmbH in current version apply as well.

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## 5.7 Versions Overview

Version	Date	Remarks, Description
1.00	23.11.15	Document created
1.10	25.01.16	Modbus Configuration: Upload -> Change -> Download
1.20	27.04.16	Declaration of conformity
2.00	17.11.16	migan2 → migan MPB
2.10	13.11.17	Change of address and title MPB
2.20	13.09.18	USB-Interface added

Certified per **DIN EN ISO 9001**.