

# MVisio Industrial HMI Lite



**Operating Manual**

English translation  
Errors and technical changes reserved

**MVisio HMI Lite in Master / Slave mode  
with integrated PLC-functionality**

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This document is the English translation.

Technical changes reserved,  
all information is subject to change.

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## 1. About this document






### 1.1 Validity

This document is valid for the MVisio HMI Lite (Human Machine Interface) of ZANDER-Aachen (art.-no. 589 101).

### 1.2 Target group

Electricians, installation-, commissioning- and service personnel with appropriate knowledge in handling automation technology components.

### 1.3 Legend

Symbol / Illustration	Meaning
	Document in printed form
	Document is available to download at <a href="http://www.zander-aachen.de">www.zander-aachen.de</a> .
	Document on USB memory stick
 Warning, Caution	Safety instruction <b>Warning:</b> Possible dangers <b>Caution:</b> Personal injuries and property damages possible
	Important information
HINT	Hint / Useful information

## 2. General safety instructions



Warning,  
Caution

- Only authorized and qualified personnel may install the device and put it into operation, i.e. personnel which
  - is well-acquainted with correct technical handling of the electrical machine equipment,
  - is familiar with the applicable regulations concerning occupational safety and accident prevention,
  - has read and understood the operating manual and, if applicable, the programming manual.
- In case of incorrect connection or inappropriate use, the safe functioning of the device during operation will no longer be guaranteed. This can result in fatal injuries or serious material loss.
- Please observe the national guidelines which are valid for the commissioning of the device.
- The electrical connection of the device must only take place when the voltage supply is switched off. This also applies to the connected sensors and actuators.
- The wiring of the device must be done in conformance with the instructions given in this operating manual.
- The person who installs and commissions the device must be protected against electrostatic charges (ground strap or ESD shoes in connection with ESD flooring).
- Opening of the device and any manipulations to the device are not allowed and shall result in loss of warranty and warranty claims.
- Please observe all the relevant safety guidelines and standards.
- Non-observance of the safety guidelines can result in death, serious injury and property damage.
- Please read the operating manual before use and preserve it carefully.
- Please ensure that the operating manual is always available at the time of assembly, commissioning and maintenance work.

### **3. About this device**

#### **3.1 Scope of Delivery**

- MVisio HMI Lite (Ord.-no.: 589101)
- Pluggable terminal block
- Sealing rubber
- Mounting bolts
- Operating manual
- USB memory stick

#### **3.2 Intended use**

The MVisio HMI Lite was designed for the use in machinery and equipment in industrial environments. The front of the device has a minimum type of protection of IP66. The permissible operating parameters must be observed for the use (see paragraph 4).

#### **3.3 Disclaimer and warranty**

If the conditions above are not complied for the intended use, the safety instructions are not followed, or maintenance work is not performed as required, it will lead to a disclaimer or a loss of warranty.

#### **3.4 Function**

The function of the device depends on the loaded user program. The logic stored in this program determines how the input signals are evaluated and how the outputs switch.

**Note!**

For program creation and programming of the MVisio HMI Lite you need the free software CODESYS of 3S-Smart Software Solutions GmbH (see paragraph 10). Furthermore, a configuration pack is required, which can be found on the included USB memory stick.

**Note!**

The user is responsible for the integration of the device into the overall system. For this, the correct electrical installation and the correct programming of the MVisio HMI Lite must be verified.

## 4. Technical data

### 4.1 Specifications

<b>Display</b>	
Touchscreen technology	Resistive
Display / Backlight	TFT Colour / LED
Colours	64 000
Brightness	200 Cd / m <sup>2</sup> typ.
Resolution	800 x 480
Diagonal	7"
Format	16:9
Dimming	Yes
Type of protection	IP 66 (front), IP 20 (back)
<b>Controller</b>	
Operating system	Linus RT
CPU	ARM Cortex A9, dual core 800 MHz
Flash	4 GB
RAM	1 GB
SD-slot	No
Memory expansion	2x USB host ports
<b>Connections</b>	
Serial connection	2x RS232, 2x RS422/RS485, galvanically isolated, 2x CAN 2.0b, galvanically isolated
Ethernet connection	2x RJ45, seperate, ETH0 - 10/100/1000 Mbit; ETH1 - 10/100 Mbit
USB connections	2x USB Host, max. 100 mA
Add-On slot	No
Power supply	DC 24 V, max. 0.3 A; Admissible voltage range DC 10 ... 32 V. DC-plug AWG24-R/C serial terminal (XCFR2), socket 5.08 mm, torque 0.5 Nm, 3-wire, min. diameter 1.5 mm <sup>2</sup> , min. electric capacity 105°C

Supported bus systems	
Ethernet / protocols	PROFINET (Controller/Master) EtherNET/IP (Scanner/Master) Modbus TCP (Master/Slave)
Field bus	Modbus RTU (Master/Slave) CANopen (Master)
Serial	2x RS232, 2x RS422/RS485, 2x CAN
PLC data	
Programming	CODESYS V3
Approved for CODESYS version	V 3.5.12.10
Programming languages	IEC 61131-3 (AWL, KOP, FUP, AS, ST)
Programming interface	Ethernet
Program memory	20000 kByte
Remanent memory	64 kByte
Other	
Real time clock	Yes (battery-backed)
Accuracy of the real time clock (at 25°C)	< 100 ppm
Weight	0.9 kg
Input fuses	Electrical



**Note!**

For applications supposed to meet EN 61131-2 specifications and especially voltage drops of 10 ms, the minimum voltage of the power supply is DC 18 V.



## 4.2 Environmental data

Parameter	Data	Standard
Surrounding temperature	0 to +50°C (vertical assembly)	EN 60068-2-14
Storage temperature	-20 to +70°C	EN 60068-2-14 EN 60068-2-2
Humidity Rating	5 to 85% r.h., non-bedewing	EN 60068-2-30
Oscillation	5 to 9 Hz, 7 mm <sub>p-p</sub> 9 ... 150 Hz, 1g	EN 60068-2-6
Shock	±50 g, 11 ms, 3 pulses per axis	EN 60068-2-27
Protection class, front	IP66	EN 60529
Protection class, back	IP20	EN 60529



### Note!

The front of the device has been tested under above conditions in accordance with the listed standards. Although the resistance level of the device meets the standards, oils that are expected to have no influence on the MVisio HMI Lite, may damage the device. This might happen in places with vaporous oils or when cutting oils with low viscosity adhere on the device for a longer period of time. If the front foil detaches or is being damaged, oil might get into the device. In this case, separate protective measures are recommended. If the installation seal is used for a long period of time or if the device and its seal are removed from the mounting panel, the original type of protection can not be guaranteed.

## 4.3 Electromagnetic compatibility

Parameter	Data	Standard
Radiation disturbance test	Class A	CISPR 22 CISPR 16-2-3
Immunity to ESD	8 kV (electrostatic discharge in the air) 4 kV (electrostatic contact discharge)	EN 6100-4-2
Immunity to radiated interference	80 MHz ... 1 GHz, 10 V/m 1.4 GHz ... 2 GHz, 3 V/m 2 GHz ... 2.7 GHz, 1 V/m	EN 61000-4-3

Immunity to burst	± 2 kV DC power connection ± 1kV signal line	EN 61000-4-4
Immunity to surge	± 0,5 kV DC mains connection (line to ground) ± 0,5 kV DC mains connection (conductor to conductor) ± 1 kV signal line (line to ground)	EN 61000-4-5
Immunity to powered H.F.	0.15 / 80 MHz, 10 V	EN 61000-4-6
Immunity to mains frequency magnetic field	Casing, 50/60 Hz, 30 A/m	EN 61000-4-8
Immunity to short voltage drops and fluctuations	Connection: AC mains; Level: 100 % duration: 1 cycle and 250 cycles (50 Hz); 40 % duration: 10 cycles (50 Hz); 70 % duration: 25 cycles (50 Hz);	
Test performed on the 230 VAC side of the power supply. DC 0%, Duration: 10 ms. 20 fields x 1 s		EN 61000-4-11
Test performed on the 24 VDC side of the testee.		EN 61000-4-29

## 4.4 Durability information

Parameter	Data
LED background lighting	More than 40 000 hours. (The time after which the brightness of the background lighting has decreased by 50% at a temperature of 25°C).



### Note!

If the ambient temperature is 40° C or higher, the quality/reliability/durability of the background lighting will be affected.

## 4.5 Dimensions

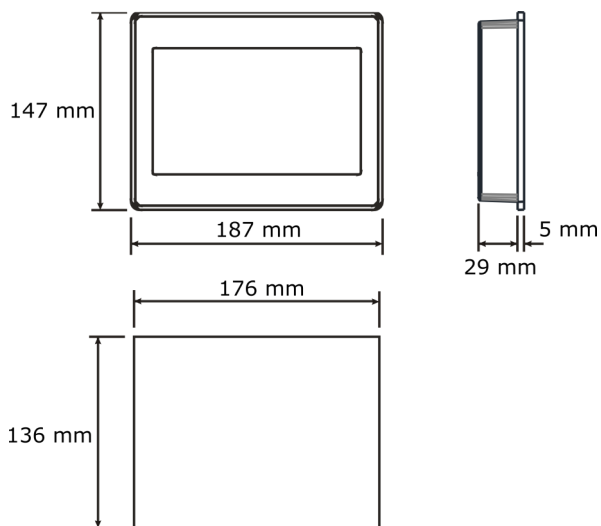


Figure 1: Dimensions of the MVisio HMI Lite

## 5. Assembly

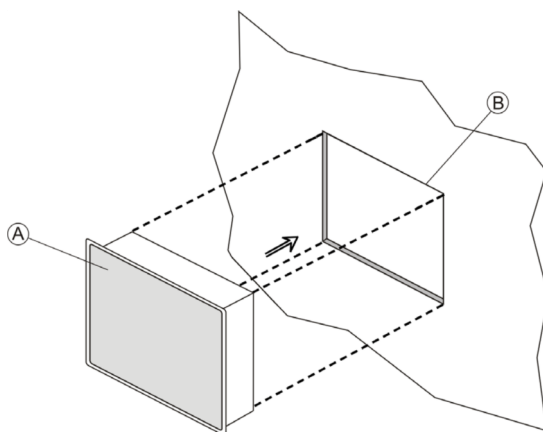


Figure 2: Assembly of the MVisio HMI

The assembly of the MVisio HMI Lite is shown in figure 2. Avoid permanent exposure to direct sunlight to prevent the device from overheating.

The MVisio HMI Lite is not designed for the installation with corrosive chemical compounds. Please check the resistance of the front foil against such compounds before the assembly.



**Note!**

Do not use tools (e.g. screw drivers) to operate the touch screen of the panel.

In order to meet the requirements of the protection class, the HMI Lite must be mounted properly. The following directions must be observed during this process:

- The brinks of the cut-out must be flat.
- Tighten the bolts until the frame corners are in contact with the HMI Lite (see fig. 3).
- The wall cut-out for the HMI Lite must be in accordance to the dimensions given in this operating manual.
- The IP66 protection class of the display can only be guaranteed, if
  - the gap between the HMI Lite and mounting wall is  $\leq 0.5$  mm.
  - the thickness of the mounting wall is between 1.5 and 6 mm.
  - the maximum surface roughness of the mounting wall in the region of the sealing is  $\leq 120$   $\mu$ m

Install the mounting in the following way:

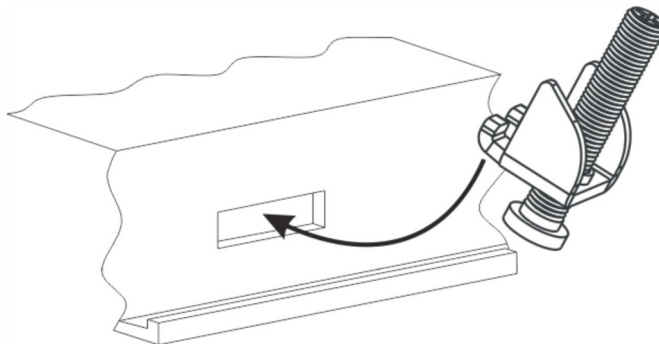


Figure 3: Usage of the assembly clamps

## 6. Electrical connections and DIP-switch configuration

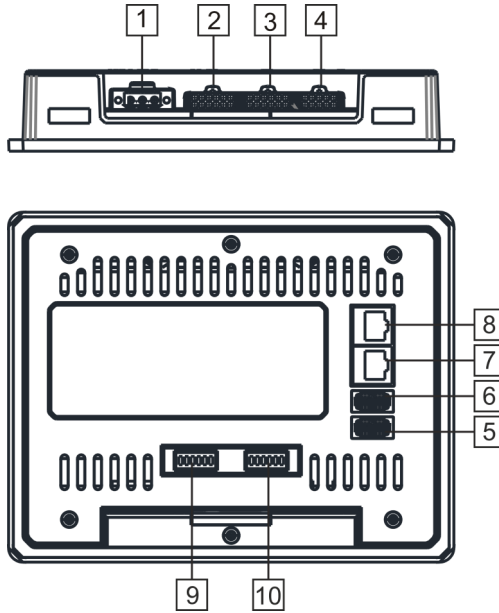


Figure 4: terminal block designation

Connection	Slot	Function
1		Power supply
2	X2	RS422/485 + CAN (COM2/CAN0)
3	X3	RS422/485 + CAN (COM3/CAN1)
4	X4	RS232 + RS232 (COM/COM4)
5	X5	USB-Port
6	X6	USB-Port
7	X7	Ethernet-Port 0 (10/100/1000 Mbit)
8	X8	Ethernet-Port 1 (10/100 Mbit)
9	S1	RS485 + CAN-Port-configuration (DIP-switch)
10	S2	RS485 + CAN-Port-configuration (DIP-switch)

S1						
Switch	6	5	4	3	2	1
CAN-A Termination					X	X
RS422/485-A Mode			X	X		
RS422/485-A Termination	X	X				

S2						
Switch	6	5	4	3	2	1
CAN-B Termination					X	X
RS422/485-B Mode			X	X		
RS422/485-B Termination	X	X				

## 6.1 Serial interfaces / CAN interfaces

### 6.1.1 RS232 (X4)

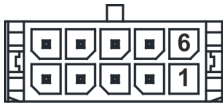


Figure 5: Terminal block designation X4

Pin	RS232	
1	GND	COM 1
2	TxD	
3	RxD	
4	RTS	
5	CTS	
6	GND	COM 4
7	TxD	
8	RxD	
9	RTS	
10	CTS	

### 6.1.2 RS485 / CAN (X2 and X3)

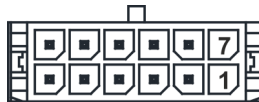


Figure 6: Terminal block designation X2 and X3

	Pin	RS485	CAN	Connection
X2	1	n.c.	GND1	CAN 0
	2		Terminating resistor	
	3		CAN-H	
	4		CAN-L	
	5		Terminating resistor	
	6	Terminating resistor	n.c.	COM 2
	7	GND		
	8	Terminating resistor		
	9	Y (TX+)		
	10	Z (TX-)		
	11	A (RX+)		
	12	B (RIX+)		
X3	1	n.c.	GND	CAN 1
	2		Terminating resistor	
	3		CAN-H	
	4		CAN-L	
	5		Terminating resistor	
	6	Terminating resistor	n.c.	COM 3
	7	GND		
	8	Terminating resistor		
	9	Y(TX+)		
	10	Z(TX-)		
	11	A(RX+)		
	12	B(RIX+)		

### 6.1.3 RS485 (CAN-Port configuration - DIP-switch S1 and S2)

Position	Description
1	CAN-terminating resistor
2	CAN-terminating resistor
3	RS485-half-duplex
4	RS485-half-duplex
5	RS485-terminating resistor
6	RS485-terminating resistor

### 6.2 Ethernet ports

The Ethernet ports have two status LEDs, see figure 7.

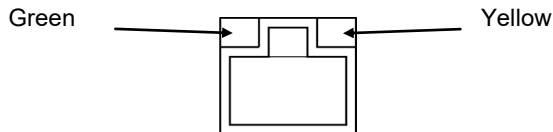


Figure 7: Ethernet port

Green	Orange	RS422/RS485
On	Off	No LAN cable connected
Flashing (active link)	On	LAN cable connected, link with 100 Mbit/s
Flashing (active link)	Off	LAN cable connected, link with 10 Mbit/s

### 6.3 USB-port

Parameter	Valid formatting
Format	FAT, FAT32
Max. size	Limited due to FAT32 specification: $\leq 4$ GB for a single file $\leq 32$ GB overall



## 7. Connecting the power supply

The pluggable terminal block for the power supply including the terminal designation is shown in figure 8. Make sure the power supply offers enough power capacity for the operating device.

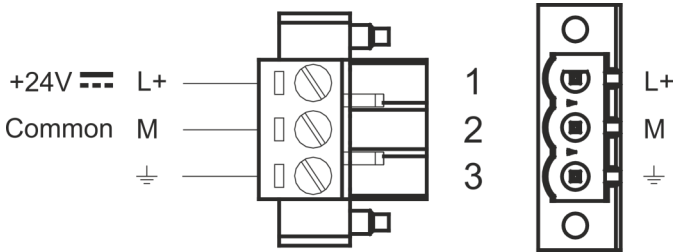


Figure 8: Terminal block designation for the power supply

The HMI Lite must always be grounded to reduce or avoid electromagnetic disturbance on the control element. The grounding of the housing must be carried out with the grounding screw near the power supply port. The screw is marked with a little grounding symbol. Furthermore, the grounding terminal of the power supply terminal block (3) should also be connected.

The power supply can be connected grounded or ungrounded. When connecting the power supply grounded, connect the ground wire to the protective conductor (see figure 9). If you are using the ungrounded connection, please note that the HMI Lite will connect the power supply line internally over a parallel circuit of a resistor (1 MOhm) and a capacitor (4.7 nF) with the ground. The power supply must have a reinforced or doubled isolation. Every device in connection with the HMI Lite must be properly grounded. The grounding must be carried out according to the applicable regulations.

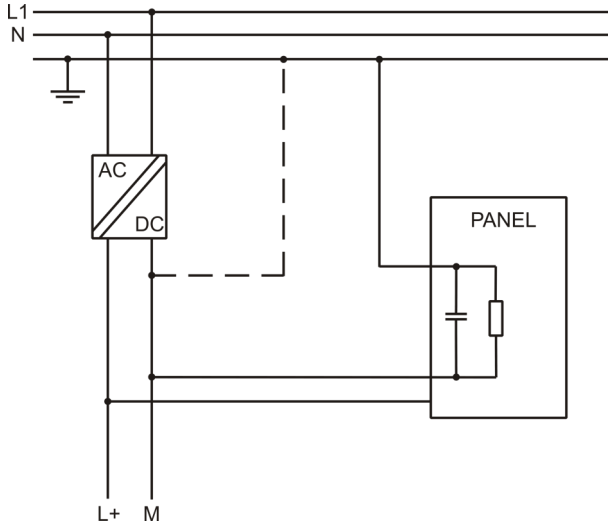


Figure 9: Connection the power supply

## 8. Battery

The HMI Lite is equipped with a rechargeable lithium battery (see figure 10), which supplies the real-time clock and can not be replaced by the customer. The battery must be charged for 48 hours at the first installation. The battery lasts for three months at a surrounding temperature of 25° C.

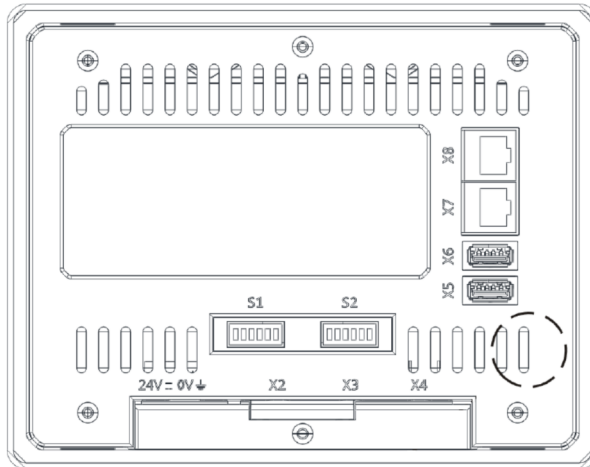


Figure 10: Position of the battery

## 9. Additional application notes

- Install the HMI Lite in accordance to this operating manual and the enclosed installation guide.
- Ground the HMI Lite in accordance to this operating manual and the enclosed installation guide.
- Only qualified personnel is allowed to install or repair the HMI Lite.
- Please make sure the ventilation holes are not covered.
- To avoid static electricity charge, make sure the front plate of the HMI Lite stays clean. The device must only be cleaned with a soft cloth and neutral soap.

## 10. First steps

### 10.1 Programming with CODESYS

The HMI Lite will be delivered with a pre-installed CODESYS-runtime. CODESYS ( $\geq$  V 3.5.12.0) and the corresponding packages for the HMI Lite must be installed on a PC with Microsoft Windows. CODESYS is a free-to-use software and can be downloaded here: <https://store.codesys.com/>. The corresponding packages can be found on the included USB memory stick. For further information regarding the installation, please see the MVisio HMI Lite installation guide.

### 10.2 System settings

The MVisio HMI Lite has a menu in which the system settings can be configured. The user interface of the system settings is based on HTML-pages which are accessible via the HMI Lite screen or via the web browser Chrome (V.44 or higher) using port 443 (see figure 11). To access the interface via web browser, type <https://IP>, with "IP" being the IP-address of your HMI Lite. The default username is "admin", the default password is "admin". Use the navigation bar on the left to browse through the available settings. The active menu is highlighted on the left. Information and settings are displayed on the right side of the screen. Dependant on the size of the display, the content as well as the menu can be displayed both at the same time.



#### **Warning!**

Undefined conditions may occur when modifying the system settings during operational mode. Restart or loss of function may be the consequence!

- Do not make any changes to the system settings during the ongoing operation.
- Switch off the machine first and cut off the connection between the HMI Lite and the machine before modifying the system settings.

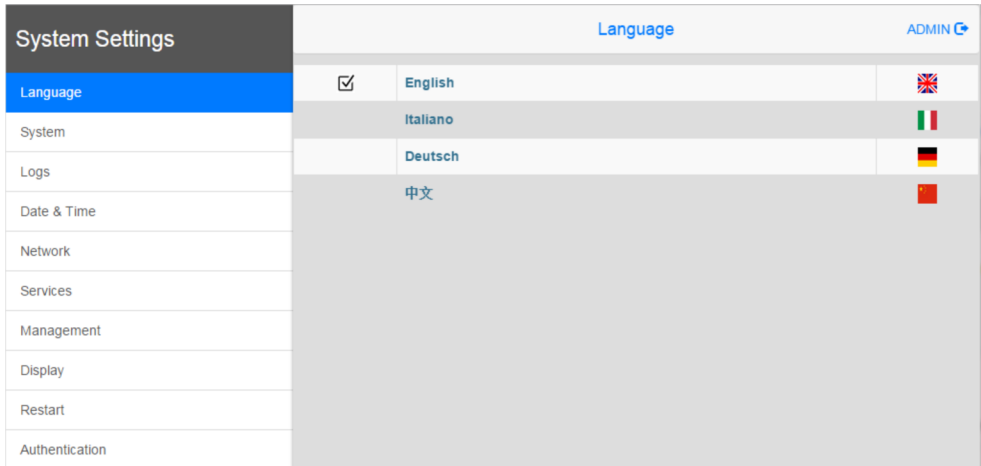


Figure 11: System settings in a browser

Another way of getting into the system settings is by starting the HMI Lite in „Tap-Tap-Mode“. To do this, you have to press the screen of the HMI with a frequency of 2 Hz or higher (at least 2 times per second) when starting the device. The screen will show up the message „Tap Tap detected, Going to Config Mode“.

Setting	Description
Language	Configures the language for the system settings menu.
System	Shows information on platform, status, timer (e.g. System on time, Backlight on time).
Logs	Activates and exports persistent protocol for BSP.
Date & Time	Changes date and time of the device, including the time zone of the NTP-server.
Network	Configures the IP-address of the Ethernet-connection and other network settings, e.g. DNS, Gateway, DHCP, host name, routing or bridging.
Services	Activates/Deactivates services. Examples for services: OpenSSH server, bridge, cloud, router, SNMP and logging.

Setting	Description
Management	Update of BSP components (Main Os, Config OS, Bootlander, Xloader), Checking consistency of partitions, update the splash screen, information on the use and size of the partitions. The Update of the main OS is only available in system mode, the update of the Config OS only in user mode.
Display	Configures the automatic display backlight, display brightness and display alignment.
Restart	Restarts the device. Normally the device is restarted in user mode via the option "Main OS". "Configuration OS" restarts the system directly into the system settings in system mode.
Authentication	Configures the password for the administrator („admin“) and user („user“). The admin has full access to the system settings (update of BSP and other system components). The standard user has restrictions.

## 11. Boxing and unboxing

When boxing the device again, please follow the instruction in reverse order.

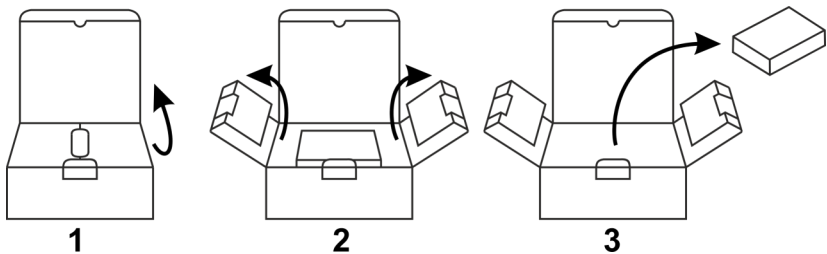


Figure 12: Unboxing the MVisio HMI Lite

## 12. Declaration of Conformity

### **Konformitätserklärung** *EC Declaration of Conformity*

**Hersteller:** H. ZANDER GmbH & Co. KG  
**Producer:** Am Gut Wolf 15 • 52070 Aachen • Deutschland

**Produktgruppe:** Human Machine Interface-Geräte (HMI)  
**Product Group:** Human Machine Interfaces devices (HMI)

Produkt Name Product Name	Anbringung der CE-Kennzeichnung Affixing of CE marking:
------------------------------	--

MVisio HMI .....	2018 <sup>1</sup>
MVisio HMI Lite .....	2018 <sup>1,2</sup>
MVisio IO .....	2018 <sup>1</sup>

**Die Produkte stimmen mit den Vorschriften folgender Europäischer Richtlinien überein:**  
 The products conform with the essential protection requirements of the following European directives:

2014/30/EU : EMV Richtlinie	2011/65/EU: RoHS Richtlinie
2014/30/EU : EMC directive	2011/65/EU: RoHS directive
2014/30/EU : Directive CEM	2011/65/EU: Directive RoHS

**Die Übereinstimmung der bezeichneten Produkte mit den Vorschriften der o.a. Richtlinie wird, falls anwendbar, nachgewiesen durch die vollständige Einhaltung folgender Normen:**

If applicable, the conformity of the designated products is proved by full compliance with the following standards:

EN 61000-6-2:2005 <sup>1</sup>	EN 61000-6-4:2007 + A1:2011 <sup>1</sup>	EN 60945:2002 <sup>1</sup>
EN 61000-6-1:2007 <sup>2</sup>	EN 61000-6-3:2007 + A1:2011 <sup>2</sup>	

<sup>1</sup> bzw / or <sup>2</sup> : Die gekennzeichneten Normen sind nur für die genauso gekennzeichneten Typen gültig.  
 The marked standards are valid only for the types marked in the same way.


**Bemerkungen / Remarks:**

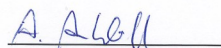
Falls die Geräte in anderen Produkte oder als Teil einer Einheit eingebaut werden, kann das die EMV-Eigenschaften beeinflussen, daher muss der Hersteller des Endprodukts sicherstellen, dass die Anforderungen der EMV-Richtlinie auch dann eingehalten werden.

When installed in other products or as part of an assembly, EMC characteristics can be affected, so in this case the manufacturer of the end product has to check the EMC characteristics again to ensure they are still in compliance with EMC Directive.

Dokumentationsbeauftragte/-r: Christiane Nittschalk  
 Documentation manager

Aachen, den 23.01.2019

  
 Dr.-Ing. Marco Zander  
 Geschäftsleitung  
 General Manager

  
 Dipl.-Ing. Alfons Austerhoff  
 Leiter CE-Konformitätsbewertung  
 Manager for EC-declaration of conformity

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F7.3-07/03

## 13. Notes