

# Operating Manual



UPPC

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## ● 1 General

### 1.1 For Your Information

- These operation instructions contain important information on handling the UPPC. Working safely requires that all safety instructions and work instructions are observed.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the UPPC and readily accessible to skilled personnel at any time.
- Observe the relevant local accident prevention regulations and general safety regulations for the UPPC's range of use.
- If the serial number gets illegible (e. g. by mechanical damage), the retraceability of the device is not possible any more.
- The UPPCs described in this operating manual are carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality inspection in all stages of manufacture.
- The manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, unauthorised modifications to the UPPC or assignment of insufficiently qualified skilled personnel.

### 1.2 Signs, Abbreviations



#### **Warning!**

A non-observance can cause injuries to persons and/or the demolition of the device. There can be a danger to life.



#### **Attention!**

A non-observance can cause a faulty operation of the device or lead to property damage.



#### **Information!**

A non-observance can have influence on the operation of the device or cause unintentional reactions of the device.



#### **Danger!**

Should the safety instructions not be observed, there is a risk of serious or fatal injury caused by electrical power.



#### **Warning!**

There is a potential for dangerous situations resulting in burns through hot surfaces or liquids, if not avoided.

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## ● 2 Transport, Packaging, Storage

### 2.1 Transport

Check the device for any damage that may have been caused during transportation. Report obvious damage at once.

### 2.2 Packaging

Do not remove packaging until just before mounting. Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending back).

### 2.3 Storage

For longer term storage avoid the following influences:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (rough deployment)
- Soot, vapour, dust and corrosive gases

If possible store the device in its original package or an equivalent one

### ● 3 For Your Safety



Warning

Before installation, commissioning and operation select the appropriate UPPC in terms of function and equipment.



More important safety instructions can be found in the individual chapters.

#### 3.1 Intended Use of the Product

The universal programmable Process-Controller UPPC is used for establishing sequential and feedback control.

The device has been designed and built solely for the intended use described here and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the device outside of its technical specifications requires the device to be taken out of service immediately and an inspection by the manufacturer.

When the device is transported from a cold into a warm environment, the formation of condensation may cause the device to malfunction. Before putting it back into operation, wait for the device temperature and the room temperature to equalise.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

#### 3.2 Personnel Qualification



Warning

##### **Risk of injury if qualification is insufficient**

Improper handling can result in considerable injury and damage to equipment.

- The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.
- Keep unqualified personnel away from hazardous areas.

For installation and start-up of the UPPC the personnel has to be familiar with the relevant regulations and directives of the country and must have the required qualification. They must have knowledge on measurement and control technology, have to be acquainted with electric circuits, are capable of carrying out the work described and can independently recognise potential hazards. Depending on the operational conditions they need to have the corresponding knowledge, e.g. of aggressive media.

#### 3.3 Special Hazards



Warning

In addition to all standard regulations, the appropriate existing codes or regulations must also be followed.

**If you do not observe the appropriate regulation, serious injuries and/or damage can occur!**



Warning

A protection from electrostatic discharge (ESD) is required.

The proper use of grounded work surfaces and personal wrist straps is required when working with exposed circuitry (PCB, printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.



Danger

There is a danger of death caused by electric current.

Upon contact with live parts, there is a direct danger of death.

Electrical instruments may only be installed and connected by skilled electrical personnel.

Operation using a defective power supply unit (e.g. short circuit from the mains voltage to the voltage output) can result in life-threatening voltages at the device.



Warning

Do not use this instrument in safety or Emergency Stop devices. Incorrect use of the device can result in injury.

## ● 4 Starting, Operation

### 4.1 Function

The UPPC is a universal programmable process control unit for switching and continuous feedback control with sequential control. The device also accepts electrical measurements.

### 4.2 Before Mounting



- Check if the UPPC was delivered in complete assembly.
- Inspect the UPPC for possible damage during transportation. Should there be any obvious damage, inform the transport company and supplier immediately.
- Keep the packaging, as it offers optimal protection during transportation.
- Make sure to protect the connecting contacts from damage.

### 4.3 Product Label (Example)

<b>MÜLLER</b>	Art.Nr.: 1310-00446	UPPC
INDUSTRIE - ELEKTRONIK GMBH Tel.: ++49 5032 /9672-0	SN.: 774.04/16-4.0-001	000
Input	: 1 x I/O 1 x Ethernet Interface	
Output	: 4 x relais change over 230 V AC/5A; 24 V DC/ 5A	
Memory	: 4 GB Micro SD DDR2 : 64 MB Flash : 128 MB MRAM : 128 kB	
Supply	: 24 VDC	

Art.Nr.: Part number  
SN : Serial number

### 4.4 Mounting

Tools: Flat-blade screwdriver

Scope of delivery: UPPC, Installation manual, fastener clips, connector plug



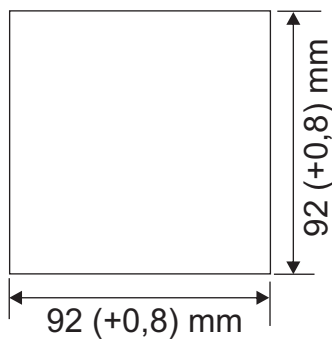
- Check the delivery immediately for completeness and obvious faults.
- If parts are missing or if there are faults, contact the transport company and supplier immediately.

## ● 4 Starting, Operation

### 4.4 Mounting (Continued)

#### Panel cut-out and mounting

- When mounting, the distance to the next device or the next wall needs to be at least 20 mm.
- When mounting, leave enough free space for the feed line between the device back side and the wall.
- The environmental temperature at the mounting point is not allowed to rise above the permitted temperature for the use at nominal value. The special hazards rules under chapter 3.3 apply.



The UPPC is meant for mounting inside a switch cabinet door or a control console.

Ensure at least 20 mm minimum clearance from the device front side.

1. Cut the cut-out into the switch cabinet door or the control console. (Please follow the measurements on the left.)
2. Push the UPPC from the front horizontally into the cut-out.



3. Clamp the fastener clips into the supports on the right and left sides of the housing.



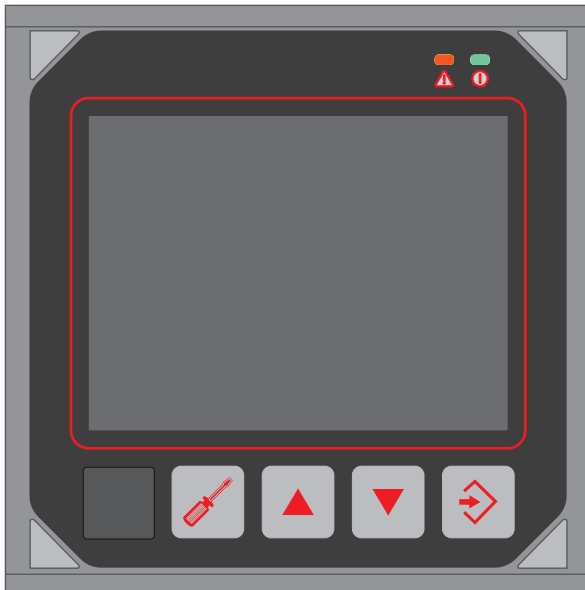
4. Press both fastener clips up until they click into place.










5. Use a flat-blade screwdriver to smoothly screw both fastener clips tight.

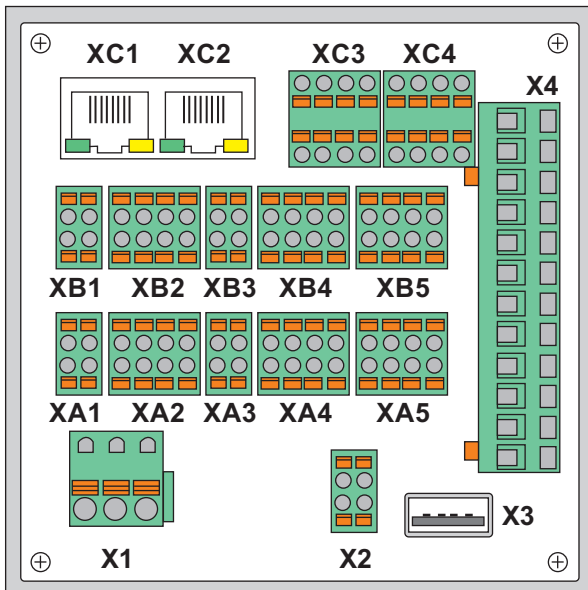
## ● 4 Starting, Operation (Continued)

### 4.5 Front of Device



-  Device „ON“,  
Freely assignable display element
-  Freely assignable display element
-  Freely assignable display element
-  Freely assignable display element
-  Freely assignable display element
-  Freely assignable display element
-  Mini USB-Port

### 4.6 Rear of Device



- X1 Voltage supply module
- X2 Sensor supply module
- X3 USB-Port (A)
- X4 Relay output module
- Xa1, Xb1 Analog output 1 (U; I)
- Xa2, Xb2 Analog output 1
- Xa3, Xb3 Analog output 2 (U; I)
- Xa4, Xb4 Analog output 2
- Xa5, Xb5 Digital Input / Output
- Xc1 Profinet CC-A, Modbus TCP, Ethernet
- Xc2 Profinet CC-A, Modbus TCP, Ethernet
- Xc3 Rs485
- Xc4 RS485, CAN

## ● 4 Starting, Operation (Continued)

### 4.7 Electrical Connection



Fasten the connector clamps tight onto the cable. The supply voltage has to be identical to the specifications on the product label.

Only operate the device when mounted.

Follow the indicated temperature restrictions for the use of the device before and during operation.

Ensure the protective conductor connection inside the corresponding equipment rack is connected **live** with the protective conductor.

### 4.8 Supply Voltage



**Danger by electrical shock!** Conduct electrical installation only in dead voltage condition.



**Property damage by electrostatic charge!**

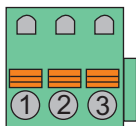
Follow safety precautions corresponding to DIN EN 61340-51/-3 to prevent an electrostatic charge!



Only qualified personnel are allowed to conduct work on the electronic circuits.

## ● 5 Electrical Connection

### 5.1 X1 Voltage Supply Module



Supply	Terminal	Signal	Note
100...240 VAC	1	L	
	2	N	
	3	PE	
24 VDC	1	+	
	2	-	
	3	PE	

1. Take the value of the supply voltage from the product label or the following tables.
2. Connect the Conductors.
3. The UPPC starts when supply voltage is applied. Boot time: ca. 17 seconds.

### 5.2 X2 Sensor Supply Module



Output	Terminal	Signal	Note
18 VDC, 45 mA	1	U+	
	2	U-	
	3	U+	
	4	U-	

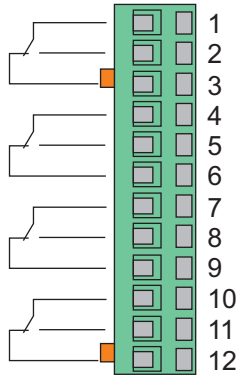
### 5.3 X3 USB-Port



USB-Host, Plug Type A, Version 2.0

## ● 5 Electrical Connection

### 5.4 X4 Relay Output Module



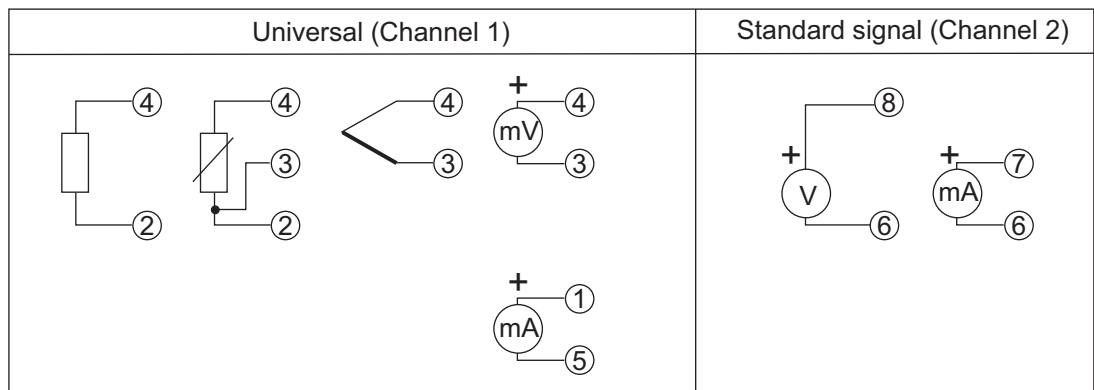
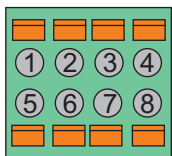
Relay	Common	Make contact	Break contact
Output 1	1	2	3
Output 2	4	5	6
Output 3	7	8	9
Output 4	10	11	12

### 5.5 XA1, XA3, XB1, XB3 Analog Output

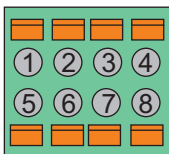


Output	Terminal	Signal	Note
Voltage	1	U-	
	2	U+	
Current	3	I-	
	4	I+	

### 5.6 XA2, XA4, XB2, XB4 Analog Input



### 5.7 XA5, XB5 Digital Input / Output

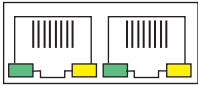


Function	Terminal	Signal	Note
24 VDC externally	5	U+	
	1	U-	
Input / Output	2	E/A 1	
	3	E/A 2	
	4	E/A 3	
	6	E/A 4	
	7	E/A 5	
	8	E/A 6	

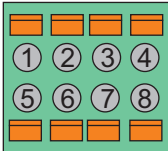


## ● 5 Electrical Connection (Continued)

### 5.8 XC1, XC2 Interface



### 5.9 XC3, XC4 Interface



Interface	Terminal	Signal	Note
RS485	1	PE (Screen)	
	2	GND	
	3	B	
	4	A	

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## ● 6 *Operation and Control*

### 6.1 Normal Operation

Applying the supply voltage starts operation. The boot time of the UPPC amounts to ca. 17 seconds.

### 6.2 Control

The UPPC can be controlled by using the touchscreen and the four buttons on the front of the device.

All functions are freely programmable. Because of this, it is not possible to describe them here. Instead, a separate manual will be supplied by the author of the respective program.

## ● 7 Maintenance, Dismounting, Return, Cleaning, Disposal

### 7.1 Maintenance

- - The UPPC are maintenance-free.
- Only the manufacturer should conduct repairs.

### 7.2 Dismounting

Create dead voltage condition on device. Disconnect electrical connections. Use chapter 4.4 in reversed order.

### 7.3 Return



Warning

Before returning the device, follow the instructions in chapter 7.4.

To return a device, use the original packaging or something comparable.

To protect against damages, use anti-static foil, insulating material or identification as sensitive measurement equipment.

### 7.4 Cleaning

Clean the device regularly to prevent dust formation on the device. Otherwise the operational capability of the touchscreen can't be guaranteed!



Property damage!

Abrasive agents or aggressive solvents can damage the touchscreen.

- Power down the device before cleaning the UPPC.
- Clean the touchscreen only with a soft, wet piece of cleaning cloth.
- Use screen cleaning agents or water with dishwashing detergent.
- Apply the cleaning agent to the cleaning cloth, **not** directly onto the device.

### 7.5 Disposal



Dispose device components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the UPPC is supplied.

Collect electrical and electronic parts separately. Separate metals and plastics. Dispose of printed circuit board assemblies professionally.

## 8 Technical Data

### Equipment

Function: 2x Input/Output modules, analog/digital (Option)  
 1x Communication module (Option)  
 1x Relay output module (Standard)  
 1x Voltage supply module (Standard)  
 1x Sensor supply module (Standard)  
 2x USB (Standard)

### Input / Output Module

**Universal input:** Number: 2 (galvanically isolated)  
 Channels: 2  
 Resolution converter: 24 Bit  
 Cycle time: 50 ms

#### Channel 1:

**Measurement: Resistance thermometer, PTC:** Accuracy: <1 K  
 Temperature drift: <0,08% / 10 K  
 Monitoring: Short circuit, sensor break

Sensor	Connection	Range	Measurement current
Pt100	3-wire	-200...850 °C	<0,5 mA
Pt1000	3-wire	-200...850 °C	<50 µA
Ni100	3-wire	-60...300 °C	<0,5 mA
Ni1000	3-wire	-60...300 °C	<50 µA
KTY 11-6	2-wire	-50...125 °C	<50 µA

**Measurement: Thermocouple:** Connection: 2-wire  
 Input resistance: >10 MΩ  
 Temperature drift: <0,08% / 10 K  
 Monitoring: sensor break  
 Compensation of cold junction: available

Sensor	Range	Accuracy	Resolution
Type L	-200...900 °C	<2 K	0,05 K
Type J	-210...1200 °C	<2 K	0,05 K
Type K	-270...1370 °C	<2 K	0,08 K
Type N	-196...1299 °C	<2 K	0,08 K
Type S	-50...1760 °C	<2 K	0,07 K
Type R	-50...1760 °C	<2 K	0,07 K
Type T	-270...400	<2 K	0,02 K
Type E	-270...1000 °C	<2 K	0,04 K
Type B	25...1820 °C	<3 K	0,1 K
Type W	0...2299 °C	<3 K	0,1 K

**Measurement: Resistance:** Connection: 2-wire  
 Range: 0...20 kΩ  
 Maximum range: Range +10%  
 Accuracy: <0,1%  
 Temperature drift: <0,08% / 10 K  
 Monitoring: Overflow maximum range

**Measurement: Current:** Connection: 2-wire  
 Range: 0...20 mA  
 Maximum range: Range ±10%  
 Input resistance: 50 Ω maximum  
 Accuracy: <0,1%  
 Temperature drift: <0,08% / 10 K  
 Monitoring: Underflow/overflow max. range

## ● 8 Technical Data (Continued)

### Input / Output Module (Continued)

#### Channel 2:

**Measurement: Standard signal current:** Input: Differential input  
Connection: 2-wire  
Range: 0...20 mA  
Maximum range: Range  $\pm 10\%$   
Accuracy:  $<0,1\%$   
Input resistance: 50  $\Omega$  maximum  
Temperature drift:  $<0,08\%$  / 10 K  
Monitoring: Underflow/overflow max. range

**Measurement: Standard signal current:** Input: Differential input  
Connection: 2-wire  
Range: 0...10 V  
Maximum range: Range  $\pm 10\%$   
Accuracy:  $<0,1\%$   
Input resistance: 1,2 M $\Omega$  (typical)  
Temperature drift:  $<0,08\%$  / 10 K  
Monitoring: Underflow/overflow max. range

**Analog Output:** Number: 2 (galvanically isolated)  
Output: Voltage, current  
Resolution converter: 12 Bit  
Linearity:  $<0,1\%$   
Accuracy:  $<0,2\%$   
Temperature drift:  $<0,1\%$  / 10 K  
Cycle time: 50 ms

Output: **Voltage:** Range: 0...+11 V  
Load resistance:  $>1$  k $\Omega$   
Ausgang: **Current:** Range: 0...+22 mA  
Working resistance: 500  $\Omega$  maximal

**Digital Inputs/Outputs:** Number: 6 (galvanically isolated)  
Supply: 24 VDC  $\pm 20\%$ , externally programmable (input or output)  
Function:  
Counter function: 2 digital inputs can be used as a counter input in combination with analog input 1  
Limiting frequency: 10 kHz  
Output signal: pulses / time unit

## ● 8 Technical Data (Continued)

### Communication Module

This module can be equipped variably, see below for possibilities:

<b>Ethernet interface:</b>	Number:	2 Ports - 10/100 MBit/s - Auto-Negotiation - Auto-MDIX - Indication:Link = LED permanent Data = LED flashes
<b>Profinet CC-A:</b>	Number:	2
<b>Modbus TCP:</b>	Number: Function:	2 Slave
<b>RS485 Interface:</b>	Number:	2 Ports - galvanically isolated - Data rate 500 Baud - Device driver for 32 nodes maximum
<b>CAN</b>	Number:	1

### Combination possibilities:

1. 1x Profinet CC-A, 1x Modbus TCP (Slave) or 1x Ethernet (LAN), 1x RS485 (Modbus RTU Master)  
1x RS485 (HPR-Bus Master)
2. 1x Profinet CC-A, 1x Modbus TCP (Slave), 1x RS485 (Modbus RTU Master), 1x CAN
3. 1x Ethernet (LAN), 1x RS485 (Modbus RTU Master), 1x RS485 (Modbus RTU Slave)
4. 1x Ethernet (LAN), 1x CAN, 1x RS485 (Modbus RTU Master)
5. 1x Ethercat, 1x Ethernet (LAN), 1x RS485 (Modbus RTU Master)
6. 1x Ethercat, 1x Ethernet (LAN), 1x CAN
7. 1x Profibus DP Slave, 1x Ethernet (LAN), 1x RS485 (Modbus RTU Master)
8. 1x Profibus DP (Slave), 1x Ethernet (LAN), 1x CAN

### Relay Output Module

Number:	4 Relays
Contact:	Changeover
Load:	230 VAC, 5 A (resistive load) 24 VDC, 5 A (resistive load)

### Voltage Supply Module

Alternating voltage:	100...240 VAC
Direct voltage:	24 VDC $\pm$ 10%
Current consumption:	350 mA maximum

### Sensor Supply Module

Voltage:	18 VDC
Current:	45 mA

### USB-Port

Front:	Type:	Mini-USB
	Version:	2.0
	Plug:	B
	Protection:	galvanically isolated
Rear:	Type:	Standard (Host)
	Version:	2.0
	Plug:	A

## ● 8 Technical Data (Continued)

### Characteristic Features

Display unit:	Display:	Resistive Touch-Screen
	Size:	3,5"
	Resolution:	320 x 240 Pixel QVGA
LED:	Number:	2
	Function:	freely assignable for status indication
Keys:	Number:	4
	Function:	freely assignable
CPU:	Type:	Cortex A8
	Frequency:	600 Mhz
Time for boot:	ca. 17 s	
Real-time clock:	buffered on loss of power	
Memory:	Mass storage:	1x Micro SD-Card, 4 GB
	RAM:	DDR2, 64 MB
	Flash:	128 MB
	MRAM:	128 kB

### Mechanics

Enclosure:	Typ:	flush mounting
	Dimensions:	98x98x115 mm (without plugs) 98x98x130 mm (with plugs)
	Ingress protection:	IP65 (front) IP20 (other parts)
	Mounting cut-out:	92x92 mm, (+0,8 mm tolerance)

### Ambient Conditions

Temperature:	Operation:	0...55 °C
	Storage:	-20...70 °C
	Transport:	-20...70 °C
Humidity:	95% rH without condensation	
Contamination level:	2	
Overvoltage:	Category II	
Altitude:	2000 m maximum	
Category a:	Rated insulation voltage:	230 V
	Testing voltage:	3000 VAC, 1 min
Category b:	Rated insulation voltage:	50 V
	Testing voltage:	520 VAC, 1 min

● 9 Dimensions (in mm)

