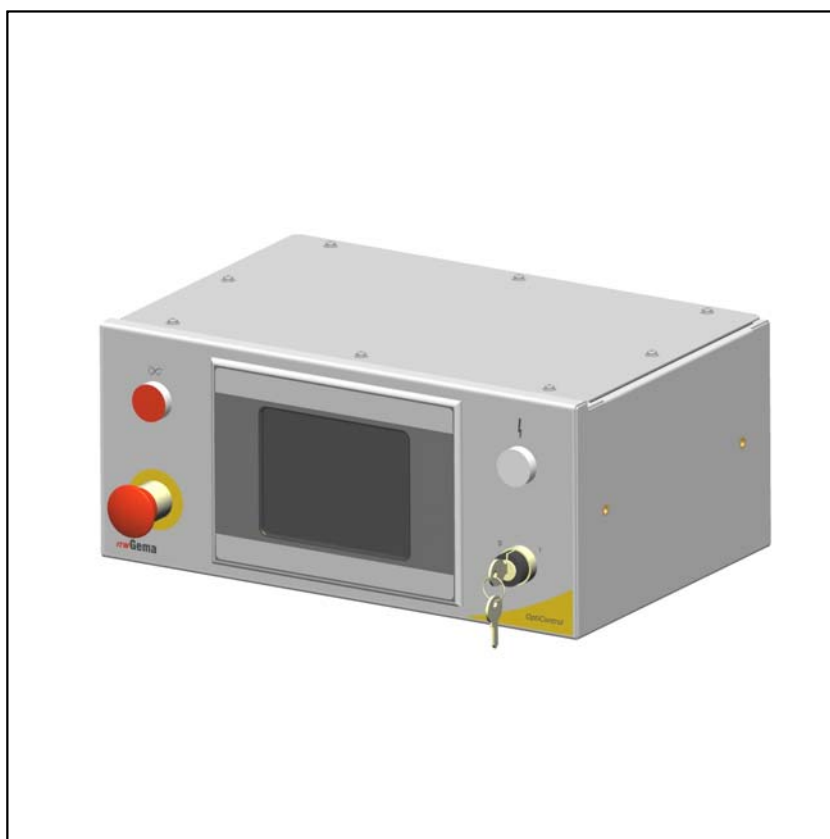


---

Operating instructions and spare parts list

# OptiControl CM22

## Plant control



Translation of the original operating instructions

## Documentation OptiControl CM22

© Copyright 2010 Gema Switzerland GmbH

All rights reserved.

This publication is protected by copyright. Unauthorized copying is prohibited by law. No part of this publication may be reproduced, photocopied, translated, stored on a retrieval system or transmitted in any form or by any means for any purpose, neither as a whole nor partially, without the express written consent of Gema Switzerland GmbH.

OptiTronic, OptiGun, EasyTronic, EasySelect, OptiFlow and SuperCorona are registered trademarks of Gema Switzerland GmbH

OptiMatic, OptiMove, OptiMaster, OptiPlus, MultiTronic and Gematic are trademarks of Gema Switzerland GmbH.

All other product names are trademarks or registered trademarks of their respective holders.

Reference is made in this manual to different trademarks or registered trademarks. Such references do not mean that the manufacturers concerned approve of or are bound in any form by this manual. We have endeavored to retain the preferred spelling of the trademarks, and registered trademarks of the copyright holders.

To the best of our knowledge and belief, the information contained in this publication was correct and valid on the date of publication. Gema Switzerland GmbH makes no representations or warranties with respect to the contents or use of this publication, and reserves the right to revise this publication and make changes to its content without prior notice.

### Printed in Switzerland

Gema Switzerland GmbH  
Mövenstrasse 17  
9015 St.Gallen  
Switzerland

Phone: +41-71-313 83 00

Fax.: +41-71-313 83 83

E-Mail: [info@gema.eu.com](mailto:info@gema.eu.com)

Homepage: [www.gemapowdercoating.com](http://www.gemapowdercoating.com)

# Table of contents

<b>General safety regulations</b>	<b>3</b>
Safety symbols (pictograms).....	3
Conformity of use.....	3
Product-specific safety measures.....	4
General information .....	4
<b>About this manual</b>	<b>5</b>
General information .....	5
Software version .....	5
<b>Function description</b>	<b>7</b>
Field of application .....	7
OptiControl CM22 - Overview .....	7
Typical characteristics.....	7
<b>Technical data</b>	<b>9</b>
OptiControl CM22 Plant control unit .....	9
System .....	9
Electrical data .....	9
Display .....	9
Dimensions .....	10
Connections .....	10
Environmental conditions.....	10
<b>Operating and display elements</b>	<b>11</b>
Operation .....	11
Front side .....	11
Rear side.....	12
<b>Start-up</b>	<b>13</b>
General information .....	13
General operating instructions .....	14
Symbols .....	14
Meaning of the colors.....	14
Function keys .....	15
Touch key fields .....	16
<b>Starting the equipment</b>	<b>17</b>
General information .....	17
Automatic operation mode .....	22
Manual operating mode .....	24
Edit axis values, select or deselect.....	24
Axes start independently from the conveyor.....	25
Edit gun values, select or deselect .....	26
Guns start independently from the conveyor .....	27

Daily correction .....	28
Simulation of the CAN bus sensor .....	28
Cleaning operation mode .....	29
<b>Object data administration</b>	<b>33</b>
Load and save object data .....	33
Copy and insert object data.....	34
Indicate object data .....	34
<b>Error messages / Diagnosis</b>	<b>35</b>
Main page error display .....	35
Check the light grid.....	36
<b>User levels and access</b>	<b>37</b>
User level 0 (gema) .....	37
User level 1 (user 1) .....	37
User level 2 (user 2) .....	37
User level 3 (user 3) .....	37
<b>Spare parts list</b>	<b>39</b>
Ordering spare parts.....	39
OptiControl CM22 - spare parts list .....	40
OptiControl CM22 - spare parts .....	41
OptiControl CM22 - spare parts (rear side) .....	42

# General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiControl CM22.

These safety regulations must be read and understood before the OptiControl CM22 is put into operation.

---

## Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

**DANGER!**

danger due to live electricity or moving parts. Possible consequences: death or serious injury

**WARNING!**

improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

**INFORMATION!**

Useful tips and other information


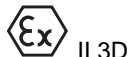
---

## Conformity of use

1. The OptiControl CM22 is built to the latest specification and conforms to the recognized technical safety regulations and is designed for the normal application of powder coating.
2. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. Gema Switzerland GmbH must be consulted prior to any use of the OptiControl CM22 for any purposes or substances other than those indicated in our guidelines.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The OptiControl CM22 should only be used,

maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of approved operational tasks) is forbidden until it has been established that the OptiControl CM22 has been set up and wired according to the guidelines for machinery (2006/42/EC). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to the OptiControl CM22 exempt the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore, the country-specific safety regulations also must be observed.

Explosion protection	Protection type
 	IP54

## Product-specific safety measures

### General information

The OptiControl CM22 is a constituent part of the system and is thus integrated into the safety system of the plant.

If it is to be used in a manner outside the scope of the safety concept, then corresponding measures must be taken.



**Note:**  
For further information, see the more detailed Gema safety regulations!

# About this manual

---

## General information

These operating manual contains all important information which you require for the working with the OptiControl CM22. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the functionality of the individual system components – booth, gun control unit, manual gun or powder injector – should be referenced to their enclosed corresponding documents.



---

### **DANGER:**

#### **Working without operating instructions**

**Working without operating instructions or with individual pages from the operating instructions may result in damage to property and personal injury if relevant safety information is not observed.**

- Before working with the device, organize the required documents and read the section «Safety requirements».
  - Work should only be carried out in accordance with the instructions of the relevant documents.
  - Always work with the complete original document.
- 

---

## Software version

This document describes the operation of the CM22 plant control with software version starting from:

Software	Version
Galileo	CM-22_V2_2a
MXPro	CM-22_V2_2a





# Function description

---

## Field of application

The OptiControl CM22 plant control is built exclusively for electrostatic coating using organic powders. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions.

The OptiControl CM22 plant control is especially well suited for the fully automatic coating of any parts. The OptiControl CM22 plant control also supports the operator optimally during a color change. The OptiControl CM22 plant control is especially well suited for operation in Magic booths.

---

## OptiControl CM22 - Overview

### Typical characteristics

All OptiStar gun control units, CR0x axis control units, light grids, powder centers and the digital in- and outputs communicate by CAN-Bus (field bus).

System	Monitor	SD Card	Number of guns	Number of stations	Axes per Station	Axis type
CM22						from ZA04
OptiControl	5.7"	1	max 24	2	4	from XT09



# Technical data

## OptiControl CM22 Plant control unit

### System

OptiControl CM22	
Processor	RISC/32 Bit, 400 MHz
Memory	64 MB
Remanent memory	125 kByte

### Electrical data

OptiControl CM22	
Nominal voltage	24 VDC SELV safety extra-low voltage
Voltage range	24 VDC according to DIN 19240 19.2 - 30.0 VDC actual
Reverse voltage protection	yes
Protection	yes (internal melting fuse)
Electrical insulation	no
Current consumption	max. 9,5 W/24 VDC
Switch-on current max.	1,5 A <sup>2</sup> s

### Display

OptiControl CM22	
Technology	TFT color LCD
Resolution	5.7" - 640 x 480 pixels (VGA)
Number of colors	65536
Display surface	115 x 86 mm
Operation	resistive touch
Front screen	VGA laminated safety glass, anti reflex coated, scratch-proof

## Dimensions

OptiControl CM22	
Mechanical dimensions	170 x 130 x 39 mm
Window	157 x 117 mm

## Connections

OptiControl CM22	
Ethernet	100Base-TX / 10Base-T
CAN	1 x CAN, not galvanic isolated
USB	USB 2.0
SD Memory Card Slot	1 x SDA Specification 1.00

## Environmental conditions

OptiControl CM22	
Climate	0-50°C, 10-85% rel. relative humidity, not condensing

# Operating and display elements

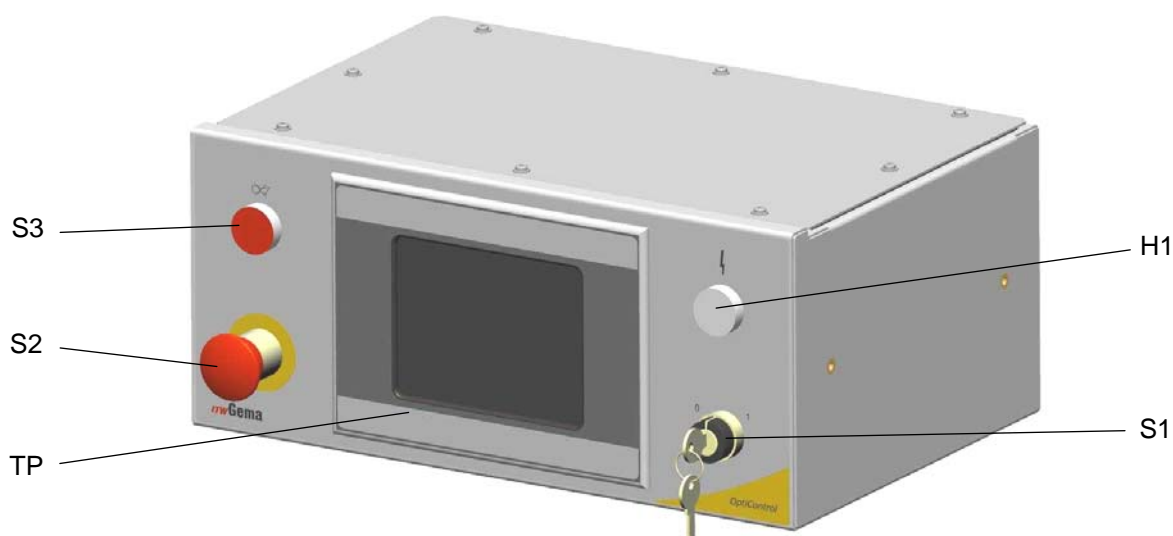
---

## Operation

All devices are operated exclusively by the touch panel, which program sequence is described on the following pages. Additionally, the following described switches and displays are available.

---

## Front side



*OptiControl CM22 - operating and display elements*

- |    |   |
|----|---|
| S1 | Key switch (control voltage ON/OFF)                     |
| S2 | Emergency stop key (plant switch off in emergency case) |
| S3 | Illuminated push button (malfunction acknowledgement)   |
| H1 | Illuminated element (control voltage OK)                |
| TP | Touch panel   |

## Rear side



*OptiControl CM22 - operating and display elements (rear side)*

- 2.3 AUX Internal control signals connection
- 2.5 CAN IN
- 2.6 CAN OUT

# Start-up

---

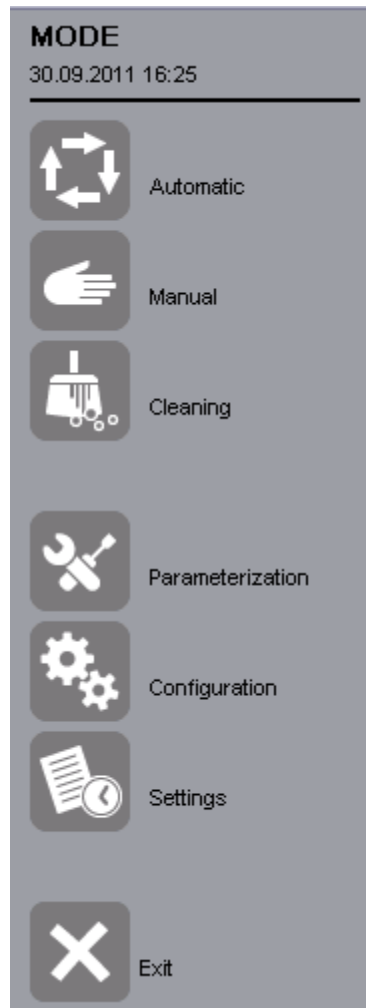
## General information

The OptiControl CM22 plant control is parameterized, configured and tested at the Gema factory. This allows for faster initial start up, with fewer parameters requiring configuration on site.

The application data in the lab report offers additional assistance, since it can be used as the default setting for guns and lifting equipment.

# General operating instructions

## Symbols



## Meaning of the colors



### Background color Grey

= present, but not active

### Background color White

= Interaction



### Border color Orange

= active state

i.e. gun is performing powder coating, fan is running, powder management system is ready





### Border color Red

= Error





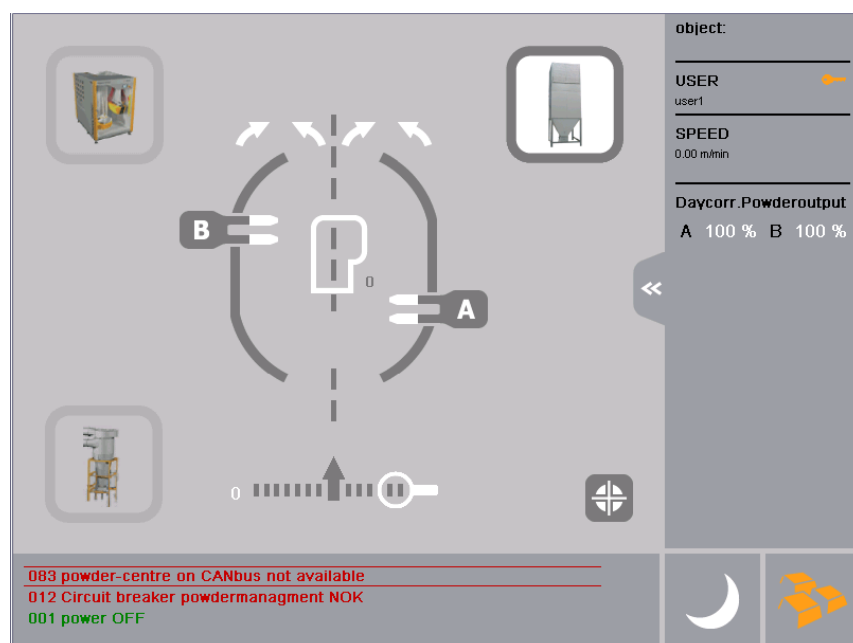
## Function keys

### Open / close the cone caps

1. Press the  key to open the cone caps
2. Press the  key to close the cone caps

### Open / close the doors

1. Press the  key to close the doors
2. Press the  key to open the doors



Error acknowledgement, alarm horn switches off.



Help key



Object data key

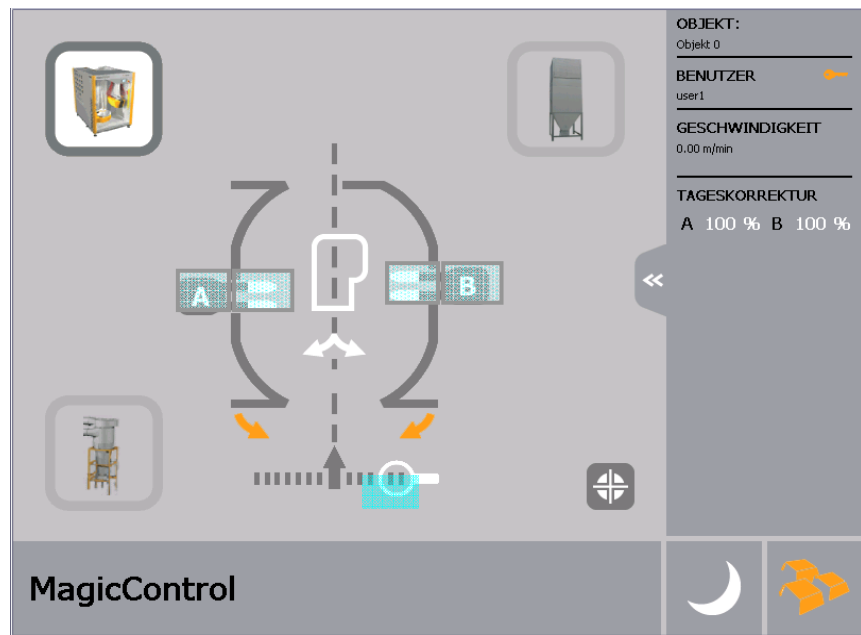


Reference point key



Light grid key

## Touch key fields



### Touch key fields



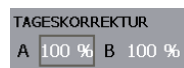
Activated touch key fields



Edit axis values, select or deselect axes



Edit gun values and select or deselect



Daily correction, select or deselect guns



Conveyor simulation, if conveyor does not run or CAN bus sensor is not installed or defective



Start and stop guns



Start and stop axes



Object data is loaded directly onto the gun and axis controller



Object data are not downloaded

# Starting the equipment

---

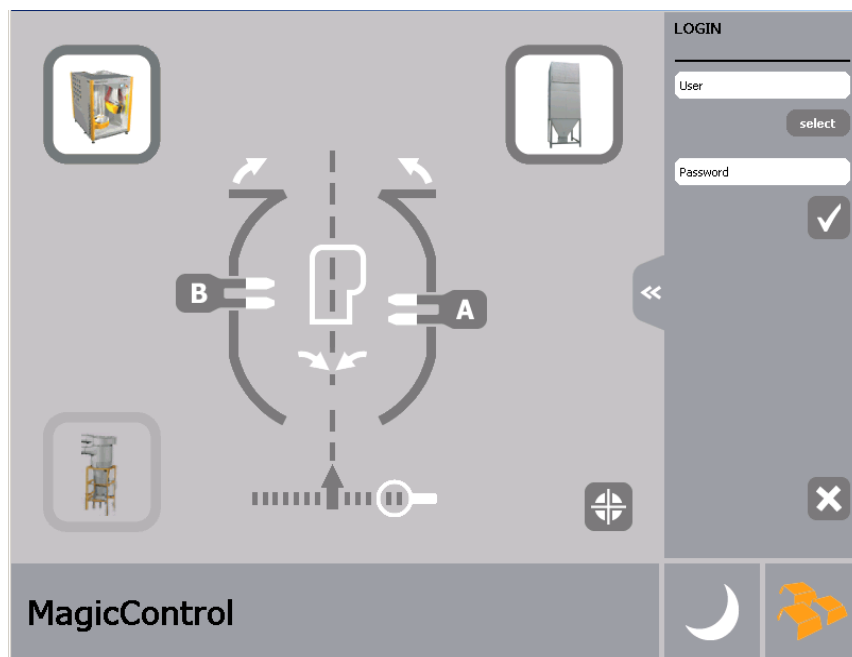
## General information

-  1. Turn main switch.

-  2.

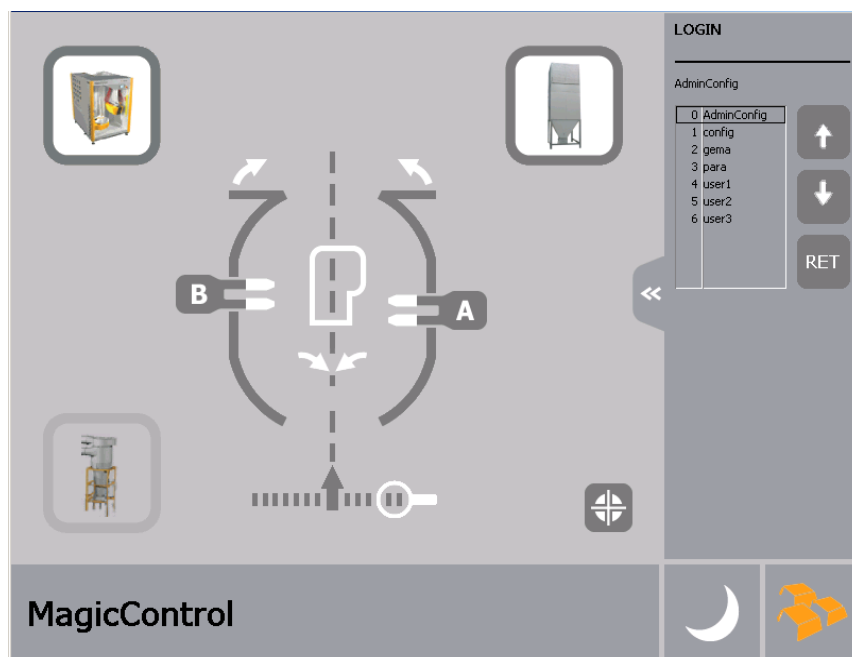
Turn key switch to turn on the control voltage.  
The control lamps illuminate. The OptiControl CM22 plant control starts the operating system, the PLC control and the operating software up to the start page.

3. Touch the screen  
The screen switches to the main page:

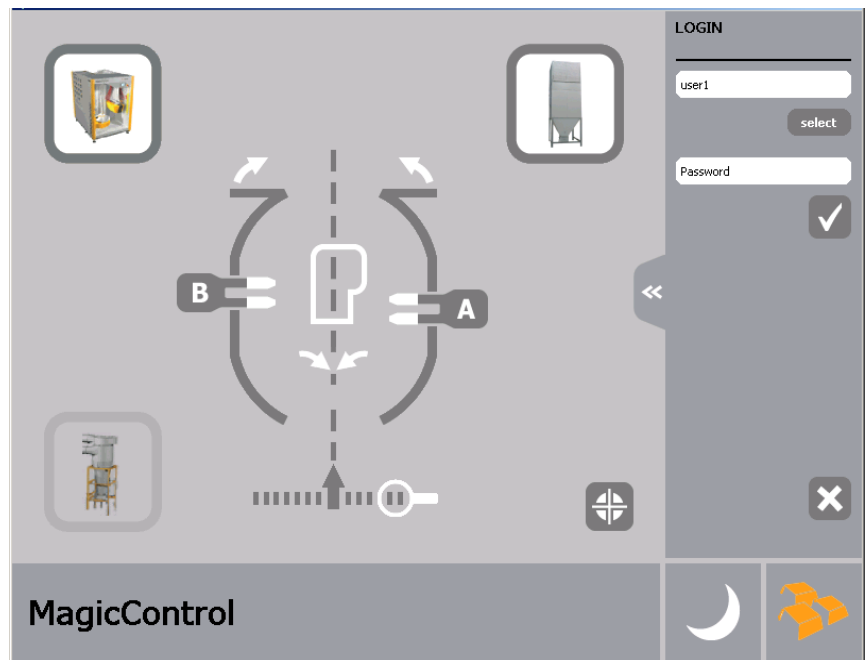


Main page not logged in

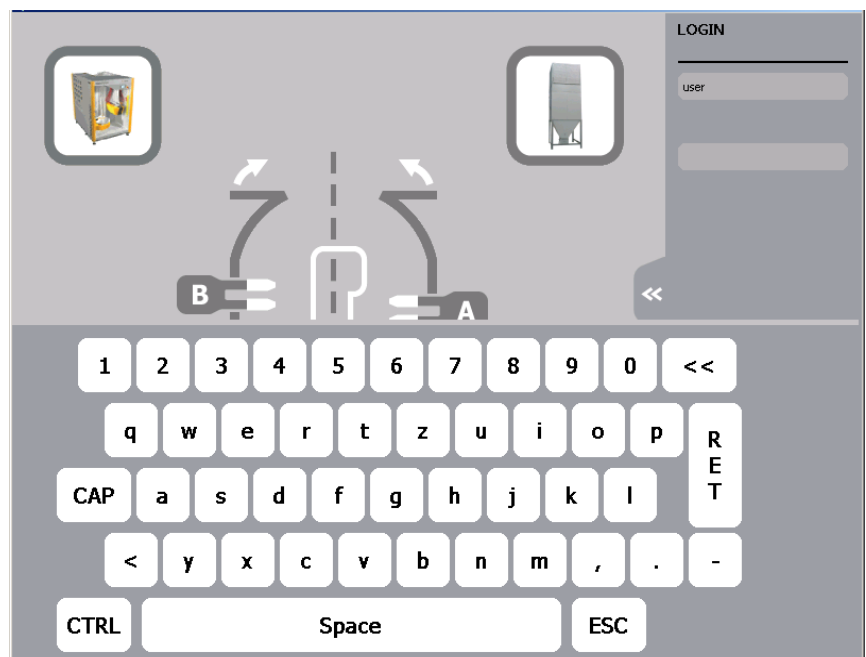
4. Push the **select** button



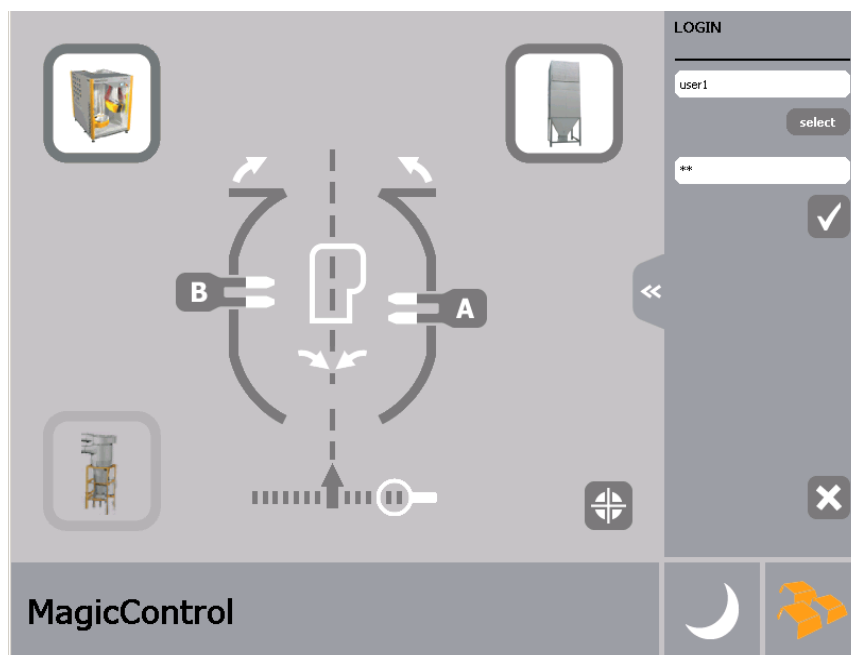
5. Press the **↑** or **↓** keys to select the desired user profile
6. Push the **RET** button



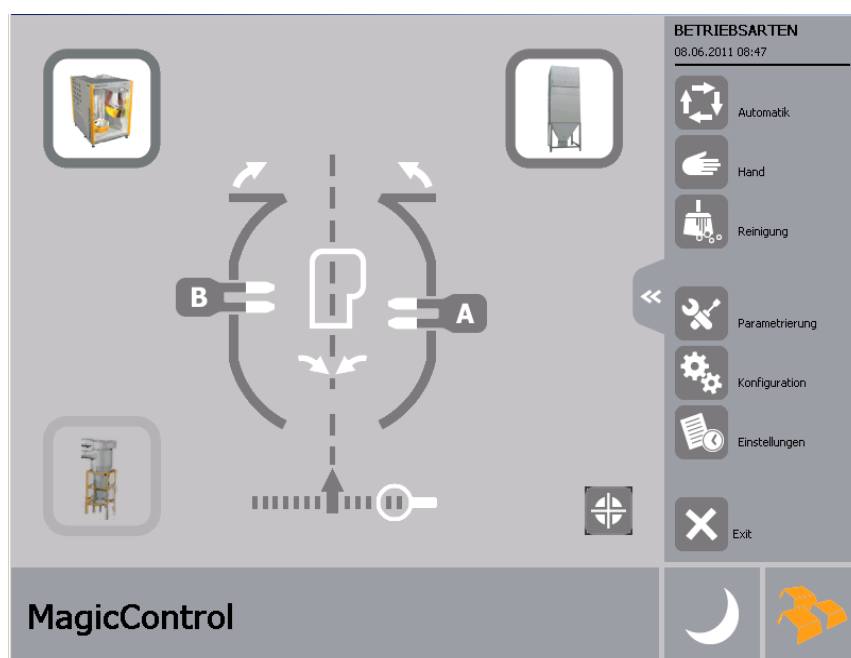
7.  Push




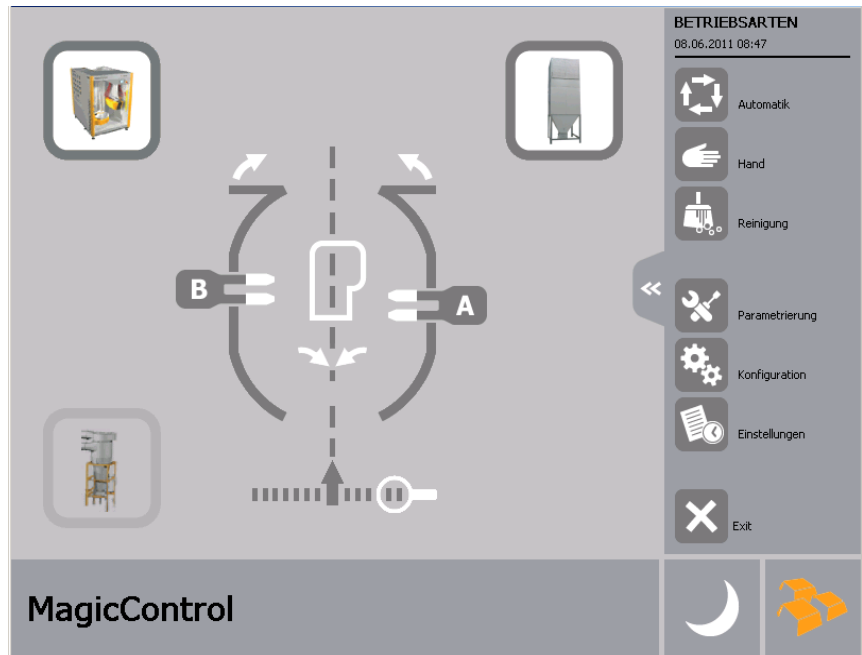
8. Input password and confirm with RET



9. Press the  key



10. Press the  key  
All axes move to their reference point position.



11. Move all other system components such as the powder management system into the proper operating mode (More information on this in the respective operating instructions)

12. Select operating mode:



Automatic operation mode

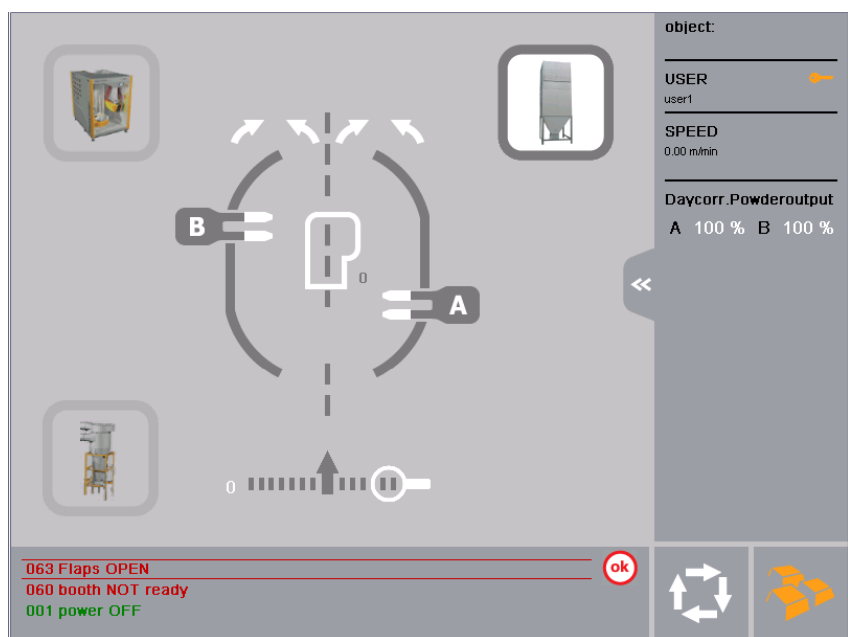


Manual operation mode




Cleaning operation mode

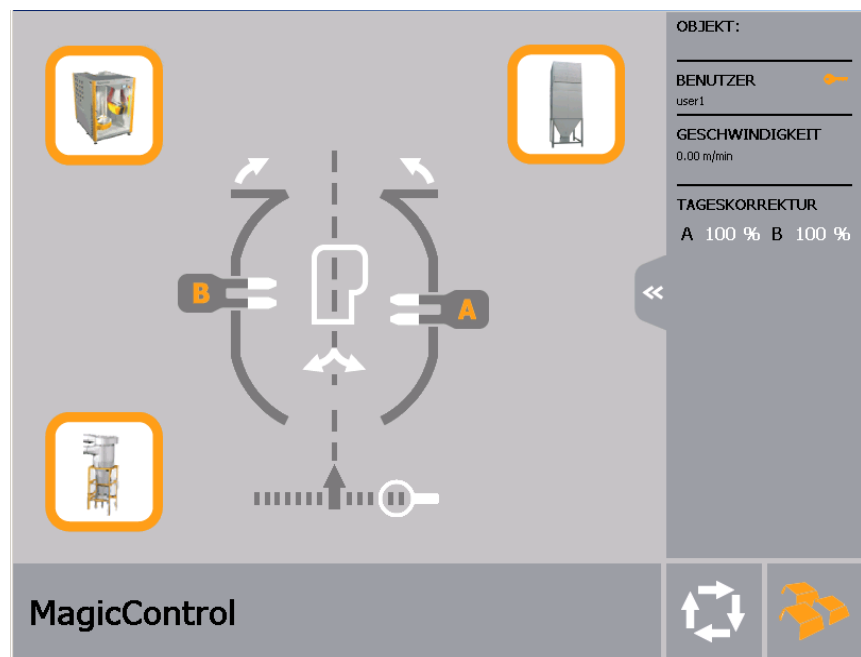
13. A message is displayed if the system components are not yet operational:



## Automatic operation mode


- The guns and axes start automatically based on the information from the light grid or the light barrier
- Object changes are carried out manually or automatically
- Daily correction of the powder output can be modified
- Guns can be selected or deselected
- Light grid can be controlled

1. Press the  key to select the automatic operating mode (For manual operation see below)

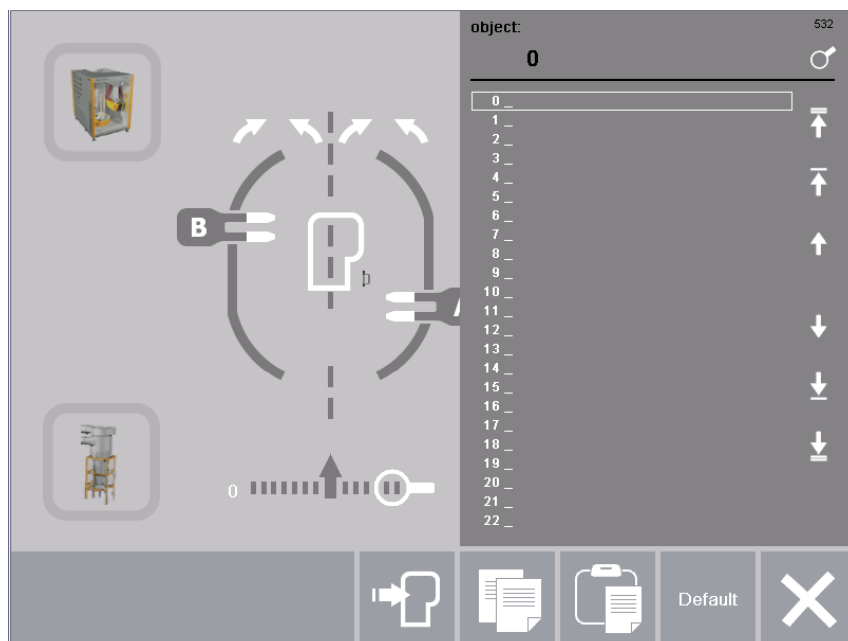


**Note:**

For systems with a regulated secondary filter, the motor switches into the “ECO mode” during automated operation. The motor does not switch to a higher frequency until parts are moved through the object recognition module.

2. Press on the  symbol to charge the coating objects (More information on this below)





3. Select desired object:

↑ = Jump to first object in the list


↑ = Page up

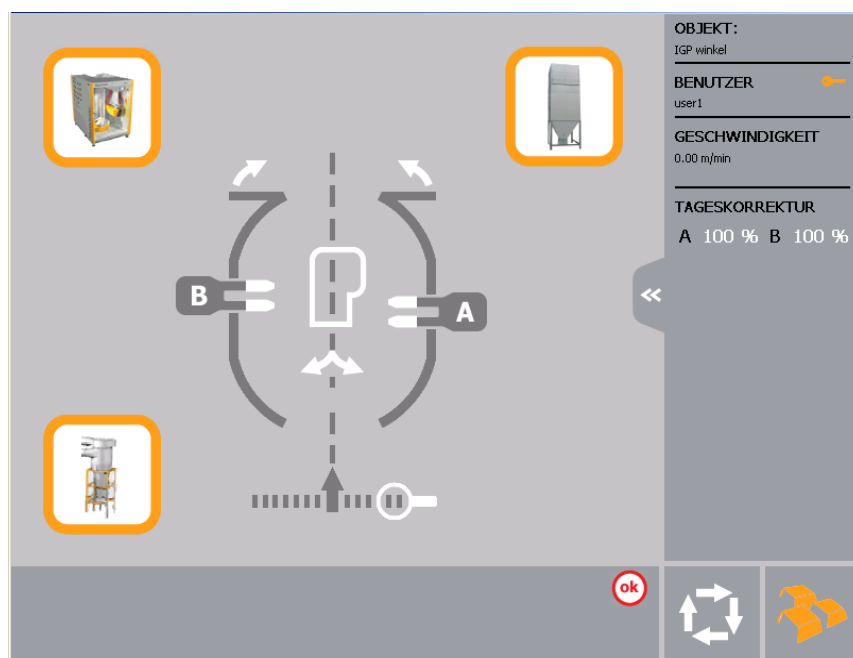
↑ = Up one row

↓ = Down one row

↓ = Page down


↓ = Jump to the last object in the list

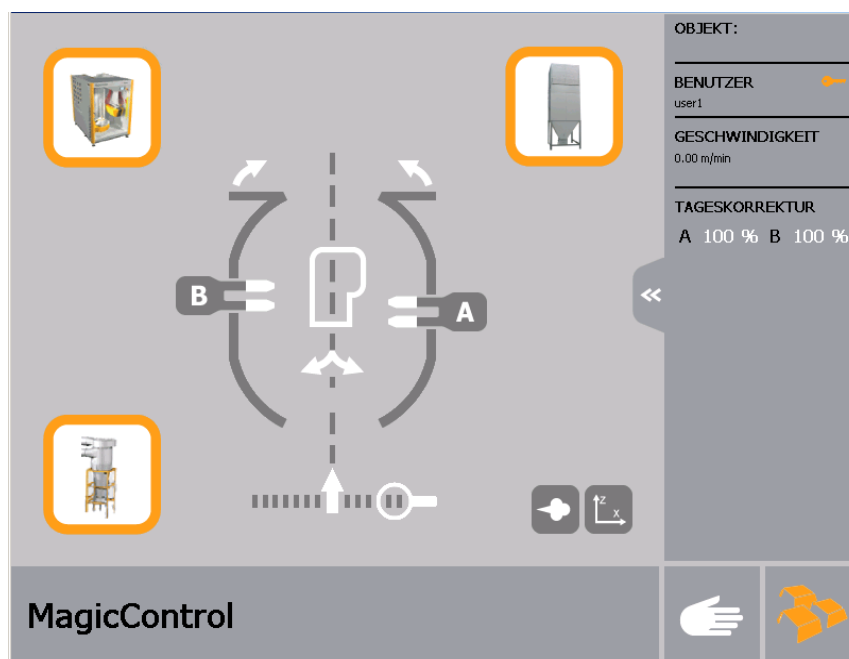
4. Press the  key to confirm the change



5. The CM22 is now ready for production

## Manual operating mode

1. Press the  button to select the manual operating mode



Manual operating mode

## Edit axis values, select or deselect

1. Press the  key  
The following page is displayed:

AXIS PARAMETER									
object:		0				TIME: 16:49		DATE: 30.09.2011	
		↑	↓	↑		spray distance	offset	extend	
		[cm]	[cm]	[cm/g]	[cm]	[cm]	[cm]	[cm]	
1	A Z	20	0	10	0		20	20	
2	A X	20		10	0	No Auto	20	20	
3	B Z	20	0	10	0		20	20	
4	B X	20		10	0	No Auto	20	20	

Edit and start axes



If the symbol is orange, then the changes can be implemented directly



Open object data management system









Save







Save as




Leave current page without saving, discard changes.












2. Press the  key  
The key turns orange  and the axis is selected.  
Only selected axes can be started.
3. Press the key   
The axes start
4. Press the key   
The axes stop
5. Touch the corresponding  input field to change the position of the axes
6. By pressing the key , the error description is displayed

## Axes start independently from the conveyor

1. Press the  key  
The key turns orange  and the activated conveyor is simulated
2. Press the  key  
The key turns orange  and the lifting devices move if the axes are selected



## Edit gun values, select or deselect

1. Press the key   
The following page is displayed:

GUN DATA PARAMETER									
object:	0								
				kV	μA		offset [cm]	extend [cm]	
1	A 01	80	5.0	100	40	0.3		10	10
2	A 02	80	5.0	100	40	0.3		10	10
3	A 03	80	5.0	100	40	0.3		10	10
4	A 04	80	5.0	100	40	0.3		10	10
5	B 01	80	5.0	100	40	0.3		10	10
6	B 02	80	5.0	100	40	0.3		10	10
7	B 03	80	5.0	100	40	0.3		10	10
8	B 04	80	5.0	100	40	0.3		10	10

Edit gun values, select or deselect



### Select or deselect guns.

1. Press the  key  
The key turns orange  and the gun is selected


### Change gun data

Gun data can either be changed individually, for each station or for all guns at once.

#### Change gun data for station

1. Push the  button
2. Station  is selected. The values are automatically changed for the selected station
3. Touch the corresponding input field to change the gun data

#### Change gun data for all guns at once

1. Push the  button
2. The values are automatically changed simultaneously for all guns
3. Touch the corresponding input field to change the gun data

**GUN DATA PARAMETER** 505

object: 0 TIME: 16:50 DATE: 30.09.2011


				kV	$\mu$ A		offset [cm]	extend [cm]
1	A 01	80	5.0	100	40	0.3		10 10
2	A 02	80	5.0	100	40	0.3		10 10
3	A 03	80	5.0	100	40	0.3		10 10
4	A 04	80	5.0	100	40	0.3		10 10
5	B 01	80	5.0	100	40	0.3		10 10
6	B 02	80	5.0	100	40	0.3		10 10
7	B 03	80	5.0	100	40	0.3		10 10
8	B 04	80	5.0	100	40	0.3		10 10


100  
80 1 2 3 4 5 6 7 8 9 0 . RET ESC <<  
0


4. Input the desired value and confirm with RET


5. Press the  key to save the changes

## Guns start independently from the conveyor

1. Press the  key

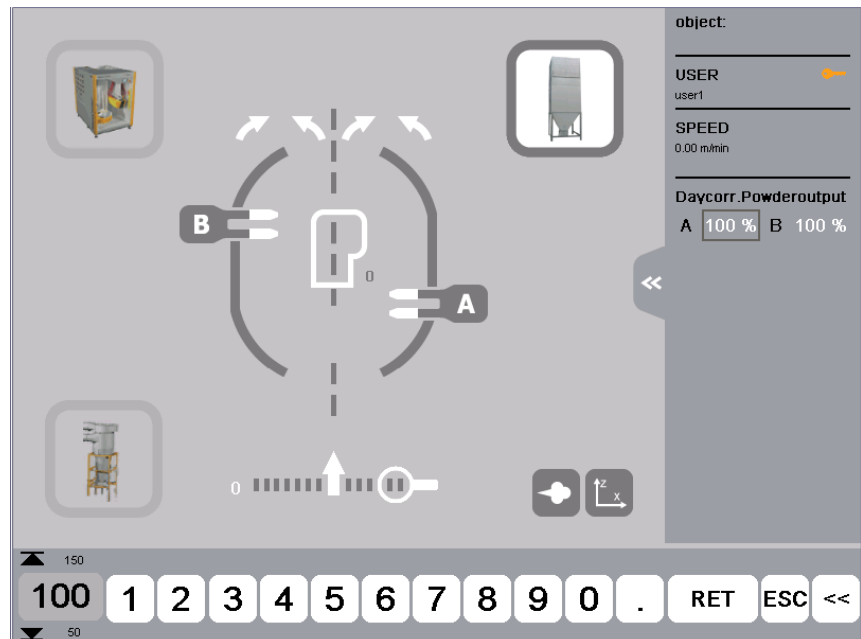
The key turns orange  and the activated conveyor is simulated

2. Press the  key

The key turns orange  and the guns spray powder if the guns are selected


## Daily correction


The CM22 control unit offers the option of making a percent-based correction of the powder output for all guns at a station.



1. Press the corresponding A 100 % B 100 % key
2. Input desired value (max. 150, min. 50)
3. Press RET key to confirm

## Simulation of the CAN bus sensor

1. Press the  key

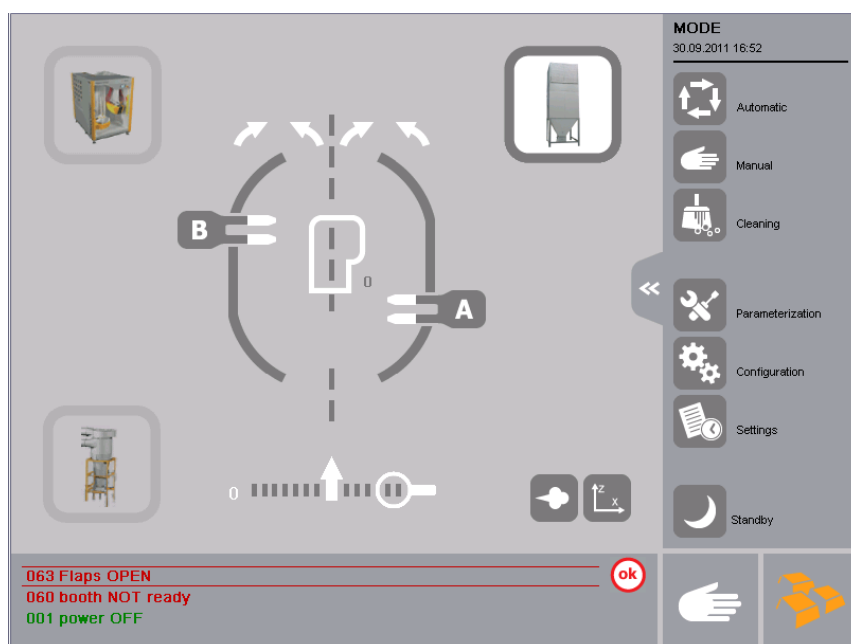
The key turns orange  and the CAN-bus sensor is simulated



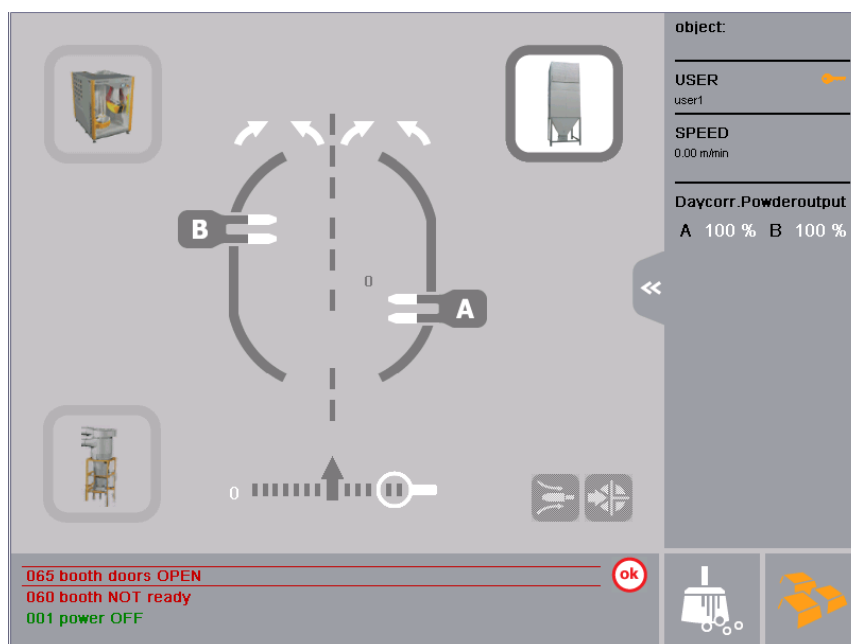
### Note:

This function is used if the CAN Bus sensor is defective or the conveyor is not operational. This simulation of the CAN Bus sensor allows for coating to be performed anyway.

## Cleaning operation mode

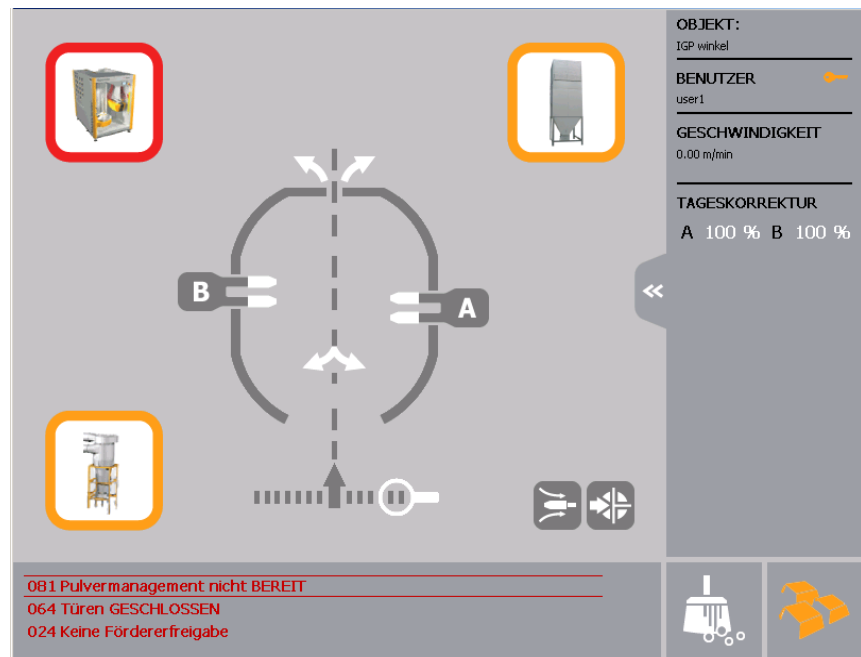


1. Press the key .  
The following page is displayed:




The cleaning of the booth floor functions at an increased cleaning frequency

2. Press  to close the booth doors




Move the axes into the cleaning position and the guns are cleaner from the exterior


3. Switch the powder management system into cleaning mode


4. Press the  key  
The external gun cleaning is started and the key turns orange



The exterior cleaning of the gun can be repeated using the  key as often as desired

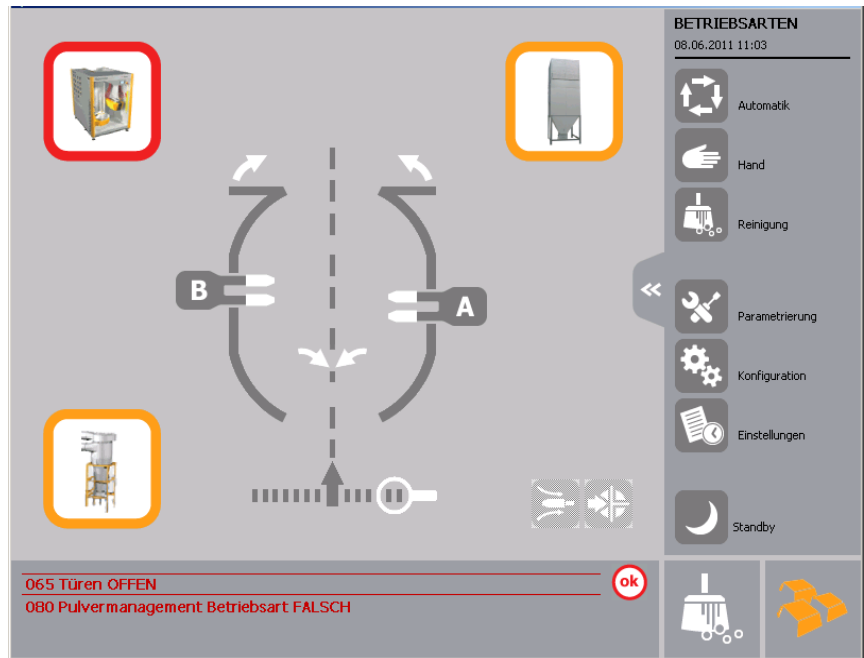
5. Follow the cleaning steps for the respective powder management system (MagicCenter, OptiCenter or powder center)
6. Once the interior of the hoses have been cleaned, the guns and nozzles can then be cleaned manually

7. Press the  button to extend the guns completely out of the booth.

8. Press  key to retract the gun into the booth.
9. Continue to follow the cleaning steps for the powder management system
10. Open the booth doors and close the caps (if present)

11. Press  to leave the cleaning mode





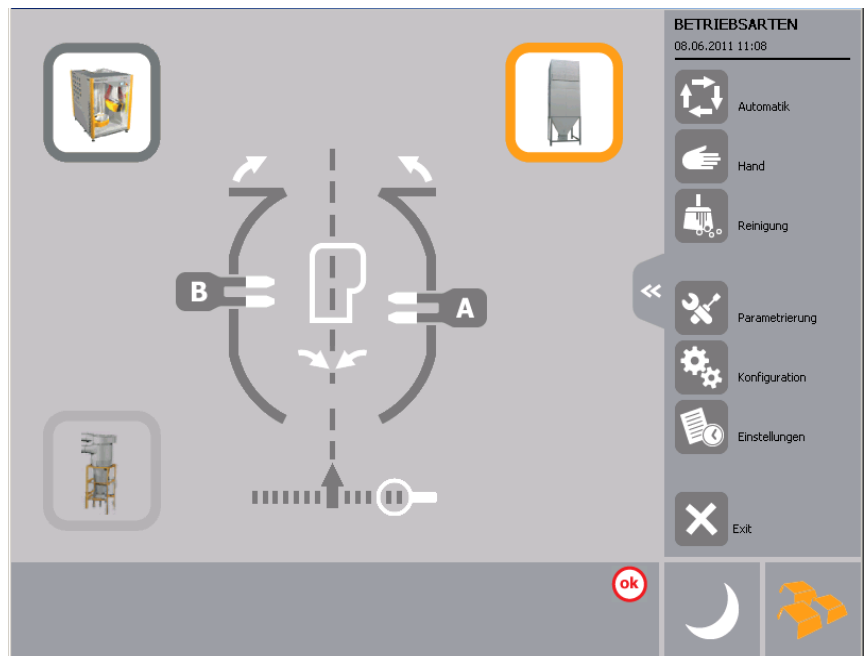
12. The cleaning of the booth floor continues to run

13. Select the desired operating mode

14. Finish production



15. Push

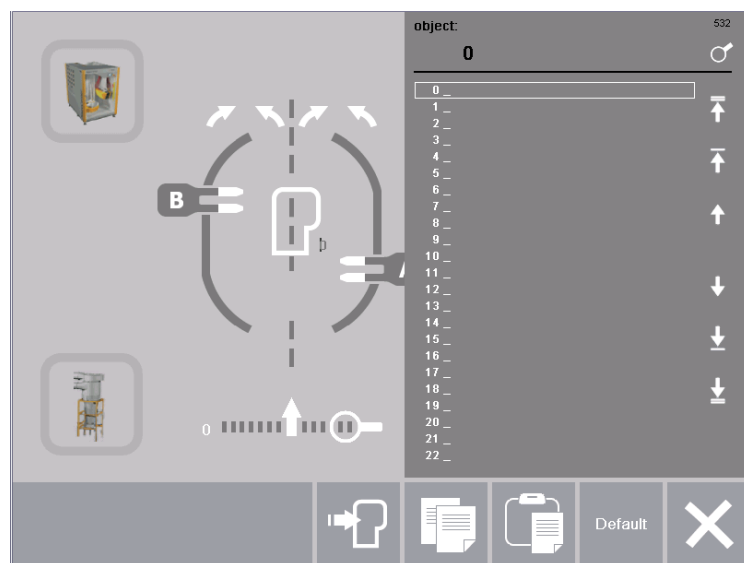


16. Push














# Object data administration

## Load and save object data

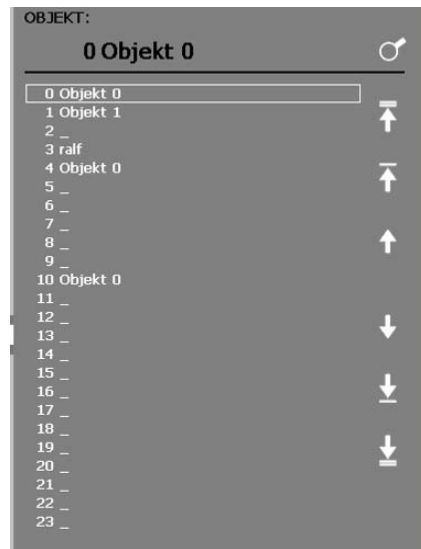


Load object data



-  = Jump to first object in the list
-  = Page up
-  = Up one row
-  = Down one row
-  = Page down
-  = Jump to the last object in the list
-  Data search by name entry
-  Copy data
-  Insert data
-  Set default value
-  Abort

## Copy and insert object data

1. Select object data

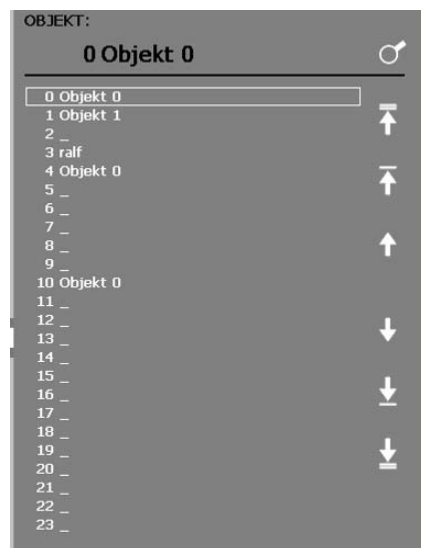


Select object data

2. Press the key  Object data is copied to the clipboard
3. With help of the arrow keys, select the object to which the data from the clipboard should be copied
4. Press the key  Object data is copied to the current object

## Indicate object data

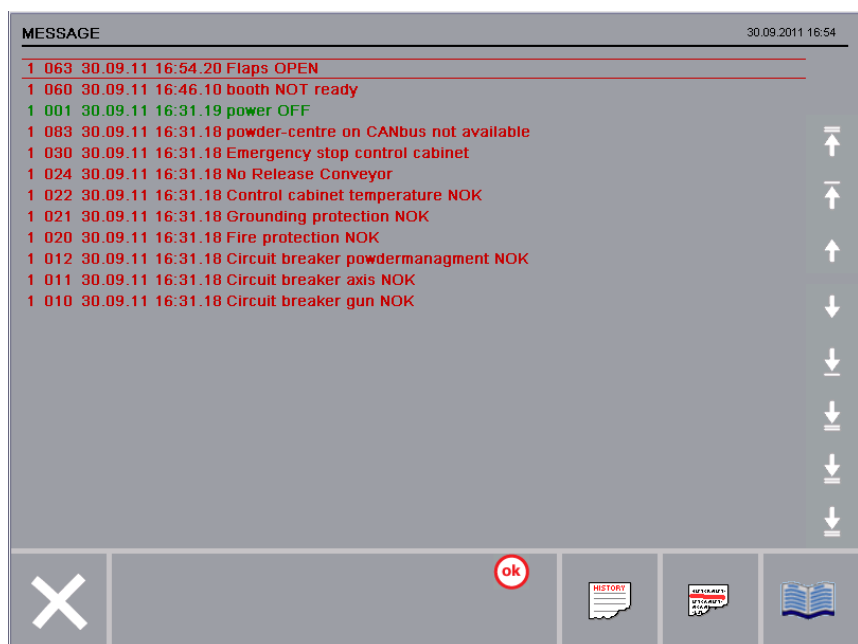
By pressing the table field, a keyboard is displayed with which the data set can be named.









Indicate object data

# Error messages / Diagnosis

## Main page error display



Error display

-  = Jump to first entry in the list
-  = Page up
-  = Up one row
-  = Down one row
-  = Page down
-  = Jump to the last entry in the list



Display error history (History)



Delete error history (History)



Jump forward to next info page



Acknowledge error

## Check the light grid

Press the key  to call up the following page:



*Light grid - information*

- Display of the width on the left and on the right
- Display the height (for beam interrupted vertically)
- Display of the segments

# User levels and access

---

## User level 0 (gema)

- The panel can be used without any limitation
- The level is reserved for Gema's technical staff
- After 3 minutes, the system logs out automatically

---

## User level 1 (user 1)

- No configuration possible
- Plant parameters and object-related data (gun and axis data) can be modified
- No automatic log-out

---

## User level 2 (user 2)

- No configuration and parameterization possible
- Plant parameters cannot be modified
- Object-related data (gun and axis data) can be modified
- No automatic log-out

---

## User level 3 (user 3)

- No configuration and parameterization possible
- The user can only activate existing object data, modify the daily correction and deselect guns
- If no user is logged in to the panel, then the user panel is locked
- No automatic log-out





# Spare parts list

---

## Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

**Example:**

- **Type** OptiControl CM22  
**Serial number** 1234 5678
- Order no. 1009 230, 1 piece, SD card

When ordering cable or hose material, the required length must also be given. The spare part numbers of this bulk stock is always marked with an \*.

Wearing parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

**Example:**

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)



---

**WARNING!**

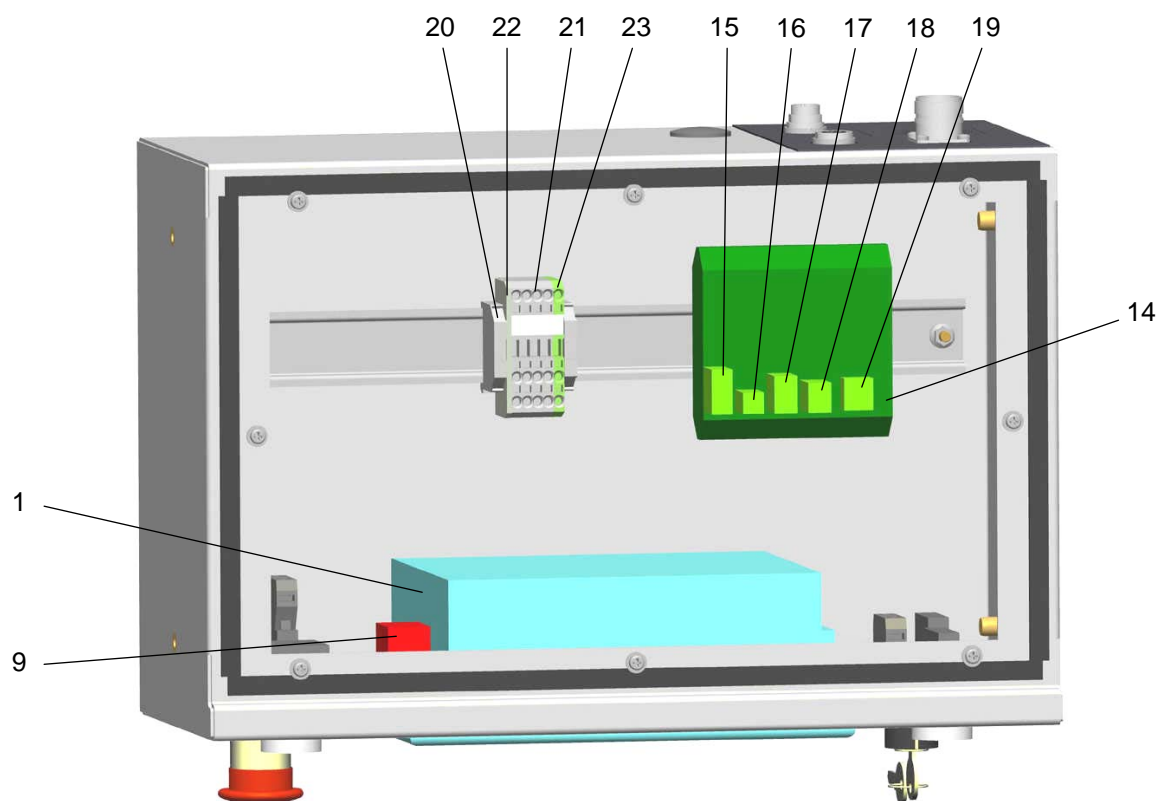
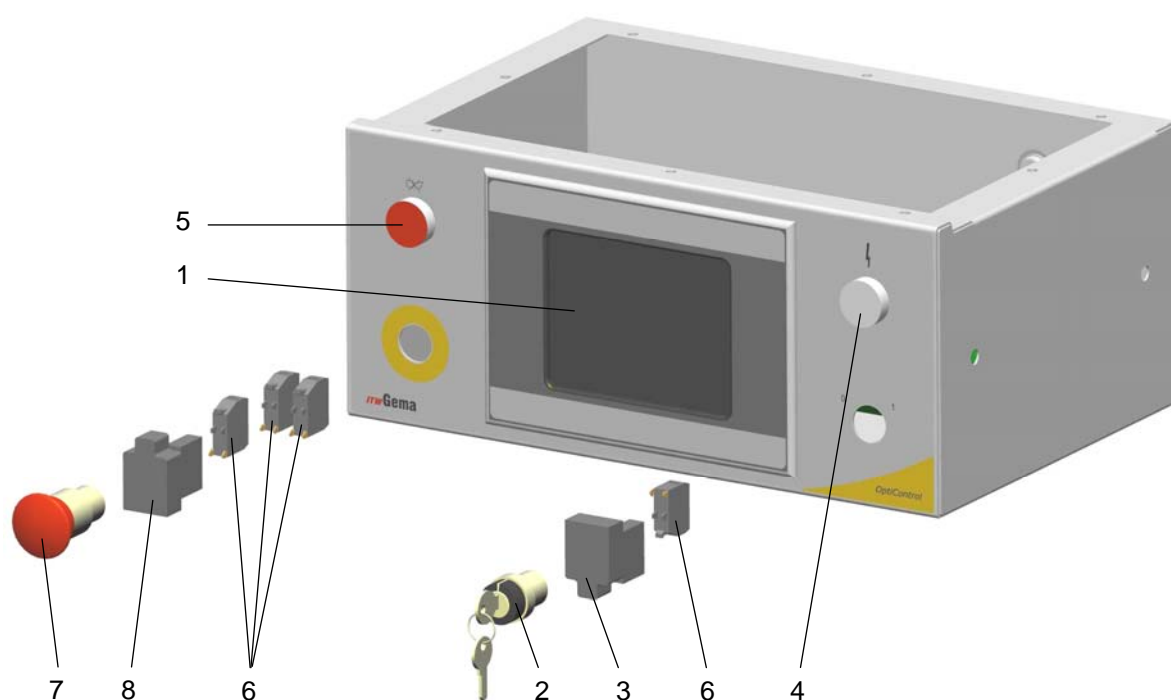
**Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!**

---

## OptiControl CM22 - spare parts list

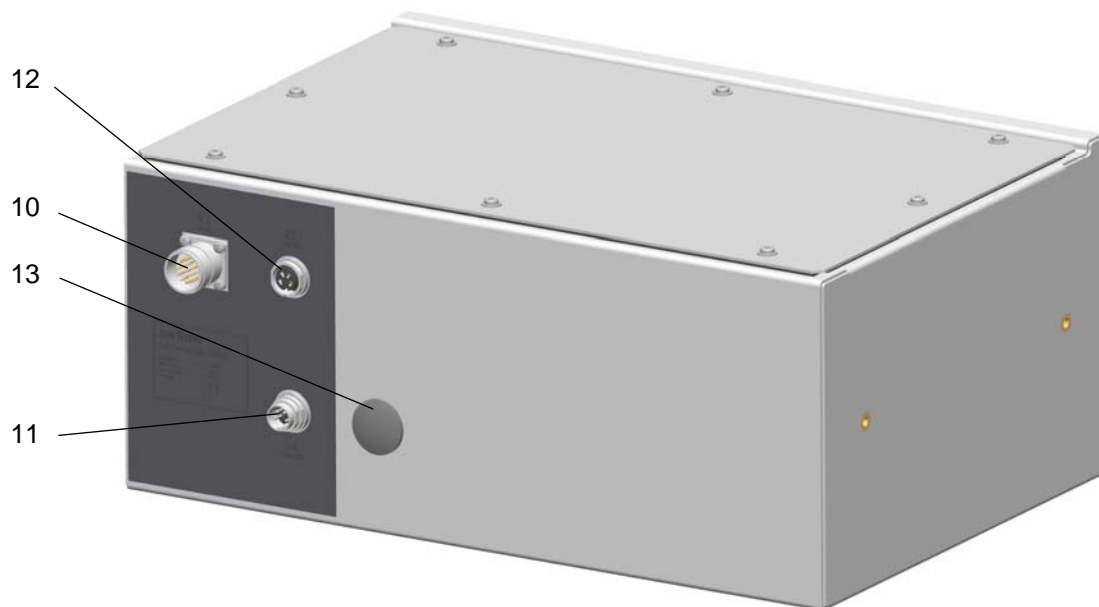
	OptiControl CM22 - complete	1002 350
1	Micro Touch Panel – XV102-5,7", complete	1008 968
2	Key switch 3, central position	268 038
3	Switch lower part - complete, maker	267 821
4	Warning lamp - 24 VDC, white	268 070
5	Illuminated push button - red	267 880
6	Standard auxiliary switch - ZBE-102, breaker	267 805
7	Emergency stop button - Ø 40 mm	267 856
8	Switch lower part - complete, breaker	268 160
9	Internal CAN connection	1001 828
10	Control signals connection AUX 2.3 - complete	1001 825
11	CAN OUT 2.6 connection - complete	1001 827
12	CAN IN 2.5 connection - complete	1001 826
13	Blind grommet - Ø 22,3 mm, black	203 653
14	CM20 adaptor	1001 806
15	Error push button cable set	1001 813
16	Warning lamp cable set	1001 812
17	Key switch cable set	1001 811
18	Emergency stop button cable set	1001 810
19	Touch Panel cable set	1001 814
20	Triple conductor end clamp - 6 mm	251 151
21	Triple conductor terminal - 2,5 mm <sup>2</sup> , P	241 636
22	Triple conductor terminal end plate - 2,5 mm	241 660
23	Triple conductor terminal - 2,5 mm <sup>2</sup> , PE	241 652
23	SD card	1009 230

## OptiControl CM22 - spare parts



OptiControl CM22 - spare parts

## OptiControl CM22 - spare parts (rear side)



*OptiControl CM22 - spare parts (rear side)*

