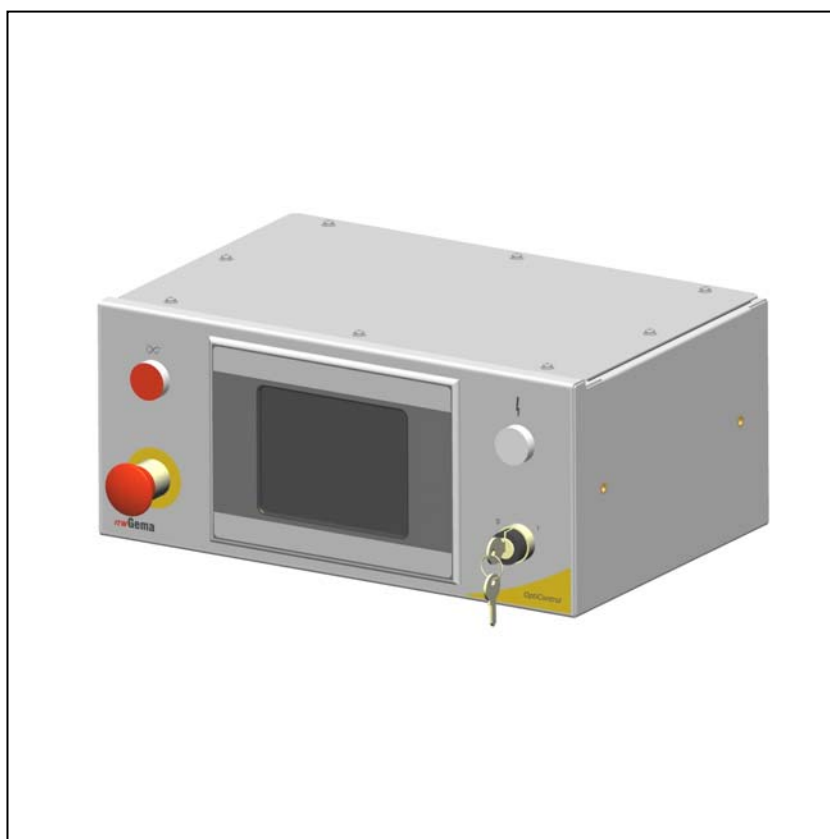


---

Operating instructions and spare parts list

# OptiControl CM21



Translation of the original operating instructions

## Documentation OptiControl CM21

© Copyright 2005 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 issue. 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>5</b>
Safety symbols (pictograms).....	5
Conformity of use.....	5
Product-specific safety measures.....	6
General information .....	6
<b>About this manual</b>	<b>7</b>
General information .....	7
Software-Version .....	7
<b>Function description</b>	<b>9</b>
Field of application .....	9
<b>Technical Data</b>	<b>11</b>
OptiControl CM21 .....	11
General .....	11
Electrical data .....	11
System .....	11
Display .....	12
Dimensions .....	12
<b>Operating and display elements</b>	<b>13</b>
Operation .....	13
Front side .....	13
Rear side.....	14
Parasitic control current circle connection .....	14
<b>Start-up</b>	<b>15</b>
General information .....	15
General operating instructions.....	15
Symbols .....	15
Function keys .....	16
Menu structure .....	16
Starting the equipment.....	17
General information .....	17
Log-in .....	18
Parameterization of the equipment.....	19
Starting points of axes and guns .....	20
Powder hose length correction .....	20
Pretravel and overtravel of axes and guns .....	21
Calibration of the CAN bus sensor .....	21
Segmentation of the light grid, masking the light grid.....	22
Segmentation of the light grid, light grid distance, minimum spraying distance.....	23
Touch fields on main page.....	23

Touch fields one level lower .....	24
Start and stop axes, select or deselect .....	25
Select and deselect guns, daily correction .....	25
Edit gun values .....	26
Check the light grid.....	26
Equipment in automatic operation mode.....	27
<b>Operating modes</b>	<b>29</b>
Overview.....	29
Manual operating mode.....	31
Edit axis values, select or deselect axes.....	32
Select or deselect guns and daily correction.....	33
Edit gun values .....	33
Axes start independently from the conveyor .....	34
Guns start independently from the conveyor.....	35
Automatic operation mode.....	36
Simulation of the CAN bus sensor .....	37
Cleaning operation .....	37
Service operation.....	39
Check the light grid.....	39
Administration of operating hours.....	40
Parameterization .....	42
General parameters.....	43
Station parameters .....	44
Starting points of axes and guns .....	44
Powder hose length correction .....	45
Pretravel and overtravel of axes and guns.....	45
Calibration of the CAN bus sensor .....	46
Light grid segmentation, masking the light grid.....	47
Light grid segmentation, light grid distance, minimum spraying distance.....	47
Various parameters .....	48
<b>Object data administration</b>	<b>49</b>
Load and save object data .....	49
Copy and insert object data.....	50
Name object data .....	51
<b>Error display</b>	<b>53</b>
Main page error display .....	53
Active CAN bus devices .....	54
Check digital inputs and set and delete outputs.....	55
<b>User levels and access</b>	<b>59</b>
Log-in.....	59
User level 0.....	59
User level 1 .....	59
User level 2.....	60
User level 3.....	60
No user level.....	60
<b>Plant configuration</b>	<b>61</b>
General information .....	61
Adjustments.....	62
Time, date, language, user, brightness .....	62

<b>Schematic diagrams</b>	<b>65</b>
Wiring diagram .....	65
<b>Spare parts list</b>	<b>67</b>
Ordering spare parts .....	67
OptiControl CM21 - spare parts list.....	68
OptiControl CM21 - spare parts .....	69
OptiControl CM21 - spare parts (rear side) .....	70



# General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiControl CM21 control unit.

These safety regulations must be read and understood before the OptiControl CM21 control unit is used.

---

## 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 CM21 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 CM21 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 CM21 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 CM21 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 CM21 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 CM21 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

This operating manual contains all important information which you require for the working with the OptiControl CM21 control unit. 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 function mode of the individual system components - booth, gun control unit, reciprocator or powder injector - you will find in the corresponding enclosed documentations.

---

## Software-Version

This document describes the operation of the OptiControl CM21, starting from the following software versions:

Software	Version
Galileo	CM21 V55_35a
MXPro	CM21_V55_35b



# Function description

---

## Field of application

The OptiControl CM21 is a master control unit. It is used exclusively for operating a powder coating system with the corresponding control units. Any other use of the product will be considered as non intended use. The manufacturer is not responsible for any damage resulting from this; the risk for this is assumed by the user alone.

The OptiControl CM21 is particularly suitable for the fully automatic coating of any kind of parts. Also in the case of color changes, the OptiControl CM21 ideally supports the operator. The OptiControl CM21 is developed particularly for the operation on the Magic booths.



# Technical Data

## OptiControl CM21

### General

OptiControl CM21	
Max. number of guns	24
Gun control unit	OptiTronic CG0x/OptiStar
Max. number of axes	4
Reciprocator control unit	CR0x
Monitor size	5,7"
Communication	by CAN bus
Operating temperature	0-40°C
Storing temperature	-20-60°C
Protection type	IP54

### Electrical data

OptiControl CM21	
Nominal voltage	24 VDC SELV, safety low voltage
Tolerance	+/- 10%
Reverse battery protection	yes
Protection	yes (internal fuse)
Potential separation	no
Power consumption	max. 34 W

### System

OptiControl CM21	
Processor	RISC/32 Bit, 400 MHz
Memory	64 MB
Remanent memory	32 kB
Compact Flash-Slot	yes / 1

## Display

OptiControl CM21	
Technology	LCD STN color
Resolution	320x240
Number of colors	256
Display surface	118x89 mm
Operation	by infrared touch
Front screen	SVG, anti reflex coated, scratch-proof

## Dimensions

OptiControl CM21	
Width	406 mm
Depth	275 mm
Height	178 mm
Weight	9.3 kg

# Operating and display elements

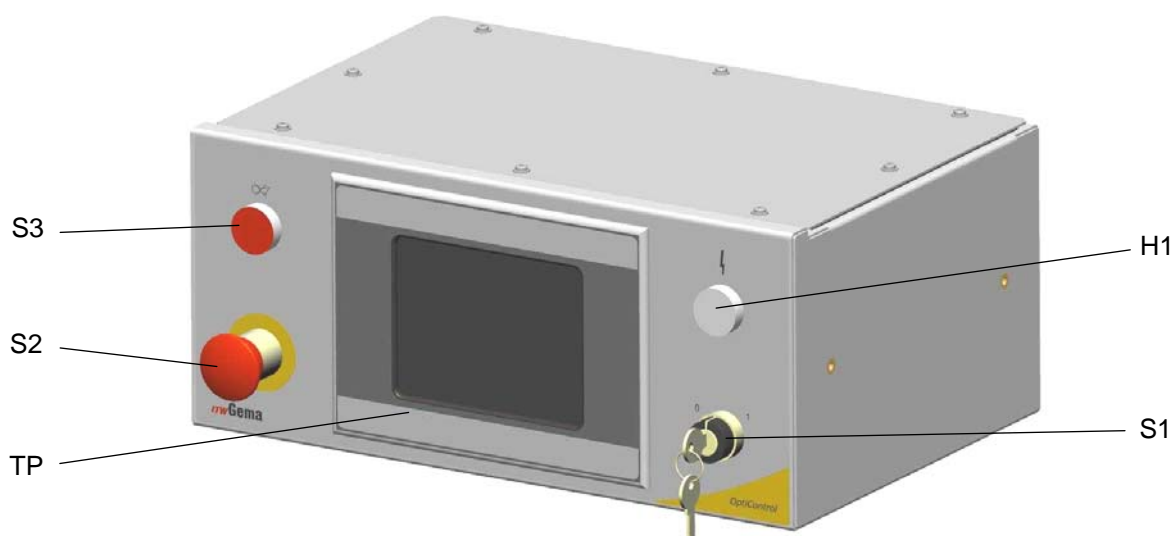
---

## 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 CM21 - 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 CM21 - operating and display elements (rear side)*

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

### Parasitic control current circle connection

There is the possibility of connecting a parasitic control current circle, additionally to the internal emergency stop control current circle. Therefore, the blind lock is replaced by a PG16 stuffing box and the control cable is connected to the existing tension spring terminals. The terminal allocation specification is described in the wiring diagram.



# Start-up

---

## General information

The OptiControl CM21 is parameterized, configured and tested at the Gema premises. This allows a faster start-up, because less parameters must be locally adjusted.

The application data in the laboratory report offer an additional assistance, because these can be used as basic adjustment for guns and reciprocators.

---

## General operating instructions

### Symbols



Key is not activated



Key is activated



Value input



Show help text

### *Violet color*



Gun not accessible by CAN bus



Axis not accessible by CAN bus

### *Yellow color*



Gun accessible by CAN bus



Axis accessible by CAN bus

### *Green color*





Gun sprays powder



Axis moves

## Function keys

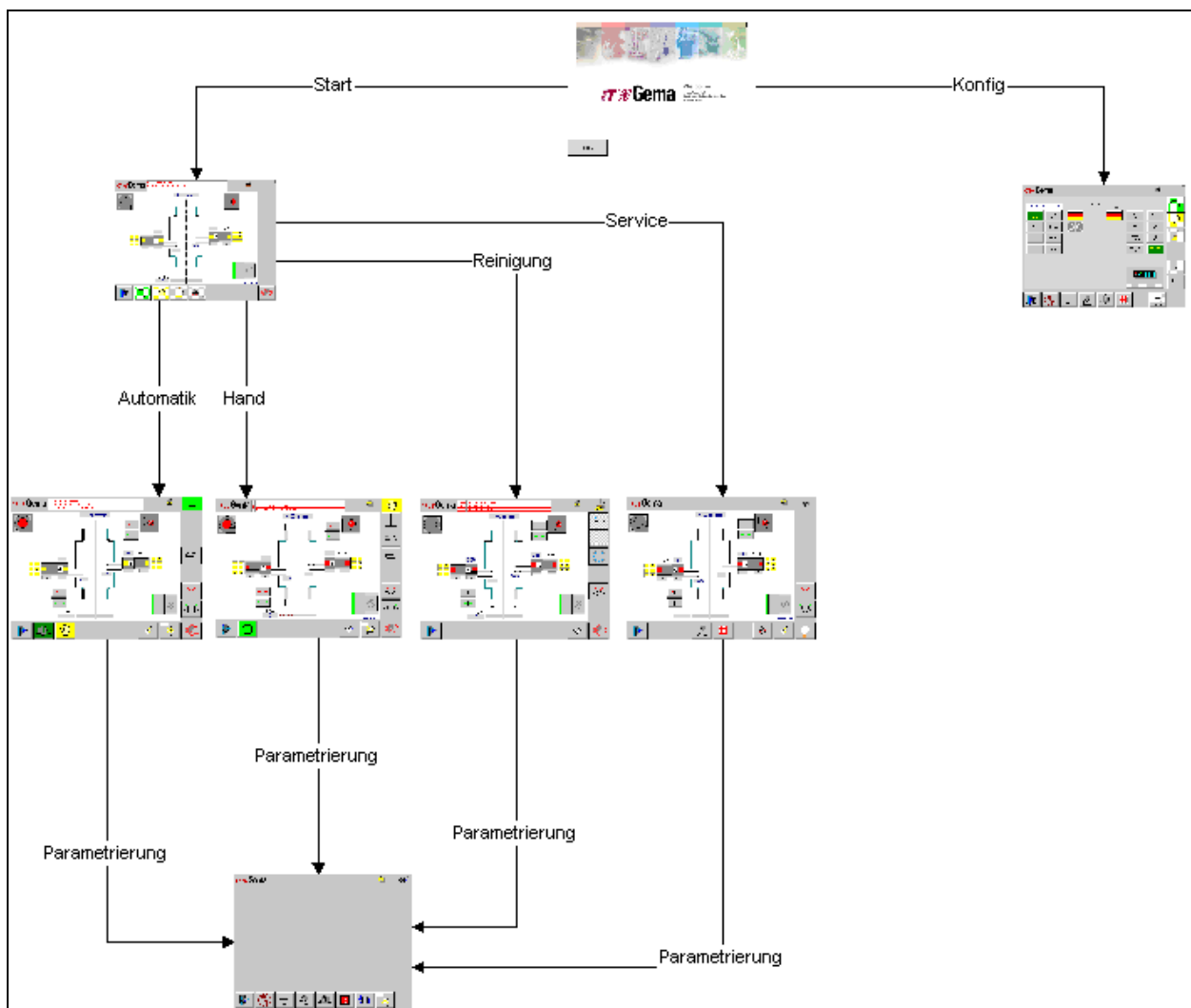
### *Open / close the cone caps*

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



Error acknowledgement, alarm horn switches off.

## Menu structure

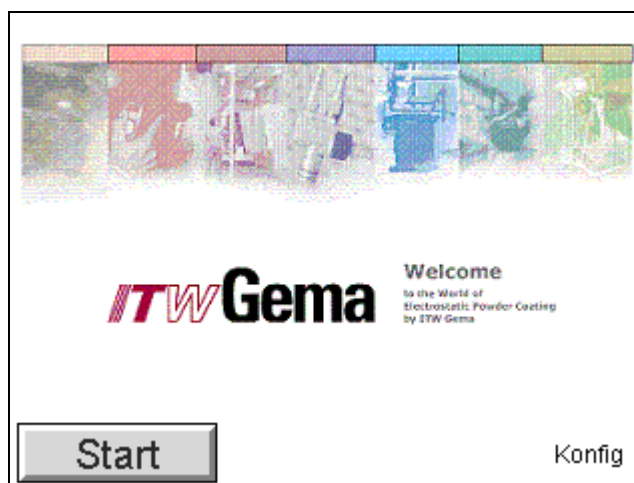


Menu structure

# Starting the equipment

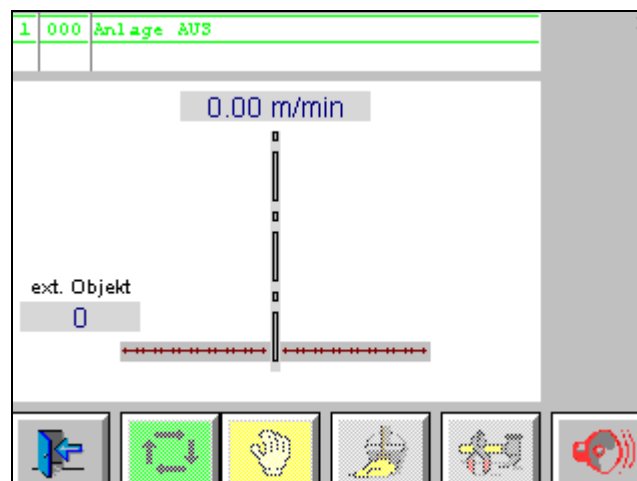
## General information

1. Switch on the main switch on the plant control cabinet. Switch on the control voltage by key switch, the illuminated element on the OptiControl CM21 shines. The OptiControl CM21 starts the operating system now, the PLC control and the operating software until to starting page.



Start page

2. Press the start key.  
The monitor switches to the main page.



Main page not logged in

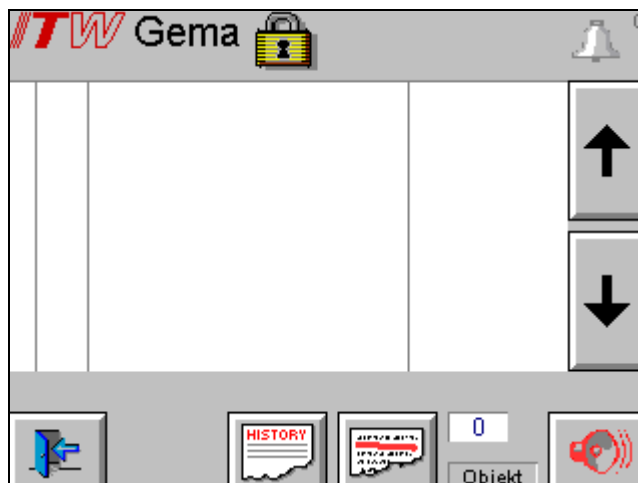
The key fields at the bottom of the monitor are locked.

By logging in on user level 3 or lower, the keys are activated for operation.

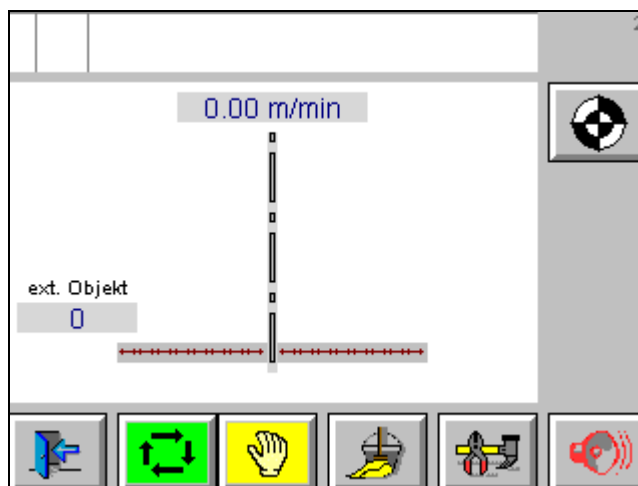
## Log-in

Press the key



The following page is displayed:

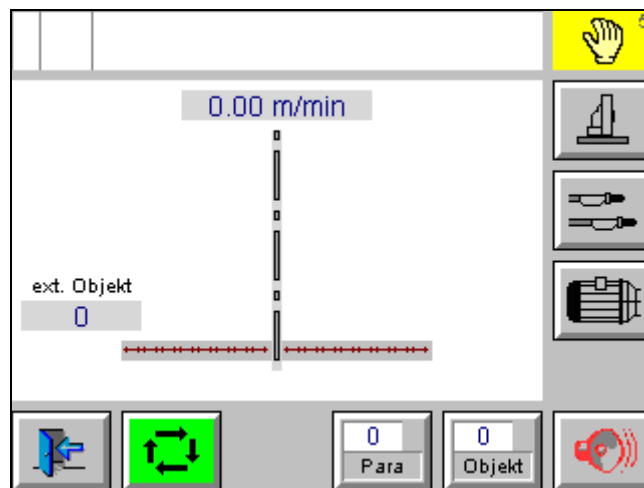


Error page for logging in



Main page logged in

3. Press the key  All axes move to their reference point position.
4. Press the key  Equipment switches to manual operating mode and the following page is displayed:



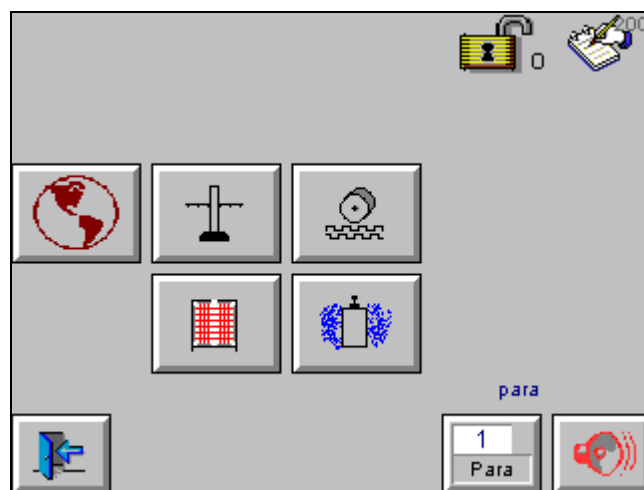
Manual operating mode

## Parameterization of the equipment



Press the key

The following page is displayed:



Main page parameterization

## Starting points of axes and guns



Press the key  
The following page is displayed:

Pistole		Startpunkt [cm]	
1	100		
2	100		
3	100		
4	100		
Achse		1 100	2 100

Navigation icons: Back, Gun A, Gun B, Help.

Starting points

Adjust starting points, pretravel and overtravel:

1. Modify starting points for each gun
2. Modify starting points for each axis

## Powder hose length correction



Press the key  
The following page is displayed:

	FL_min	SKW%		FL_min	SKW%		FL_min	SKW%
1	1.8	100						
2	1.8	100						
3	1.8	100						
4	1.8	100						


Navigation icons: Back, Gun A, Gun B, Help.

Powder hose length correction

1. Determine and enter the minimum powder output (FL\_min) and correction value (SKW%) in accordance to the OptiTronic CG02 operating instructions

## Pretravel and overtravel of axes and guns



Press the key   
The following page is displayed:

	Pistole	Vorlauf [cm]	Nachlauf [cm]
1			
2			
3			
4			
Achse	1	20	20
	2	20	20

Navigation icons: Back, Home, A, B, and Manual.





*Pretravel and overtravel of axes and guns*

1. Adjust pretravel and overtravel for each axis
2. Adjust pretravel and overtravel of the guns

## Calibration of the CAN bus sensor



Press the key   
The following page is displayed:

Encoder		1	
508292 Inkr/mm		0	
1.4 Var. 1	Messstrecke	2000 mm	
1.5 Var. 2	Messstrecke	2000 mm	Messzeit
		30 s	
1.6 Var. 3	aktuelle V Förderer	0.00 m/min	
1.7 Var. 4	Durchmesser Antriebswelle	0 mm	

Navigation icons: Back, Home, and Manual.

*Calibration of the CAN bus sensor*

Four calibration options are available

1. Calibrating a measuring section of 2 meters by start/stop key
2. Calibrating a measuring section of 2 meters with the indication of the time needed for it by pressing the start key
3. Calibrating by indicating the current conveying speed and by pressing the start key

4. Calibrating by indicating the drive shaft diameter and by pressing the start key
5. Adjust the preceding sign of the CAN bus sensor

## Segmentation of the light grid, masking the light grid



Press the key

The following page is displayed:

Pistolengruppe		106	
1	000000000001111	5	111111111111111
2	000000001111000	6	111111111111111
3	000001111000000	7	111111111111111
4	111110000000000	8	111111111111111
Maskierung		111111111111111	

*Light grid evaluation for gun shutdown*

1. Light grid distance is the distance between two light grid widths
2. Spraying distance is the shortest spraying distance needed on the equipment

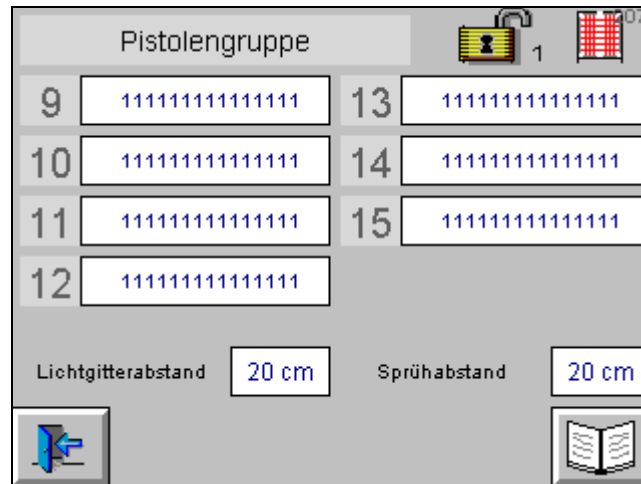


## Segmentation of the light grid, light grid distance, minimum spraying distance



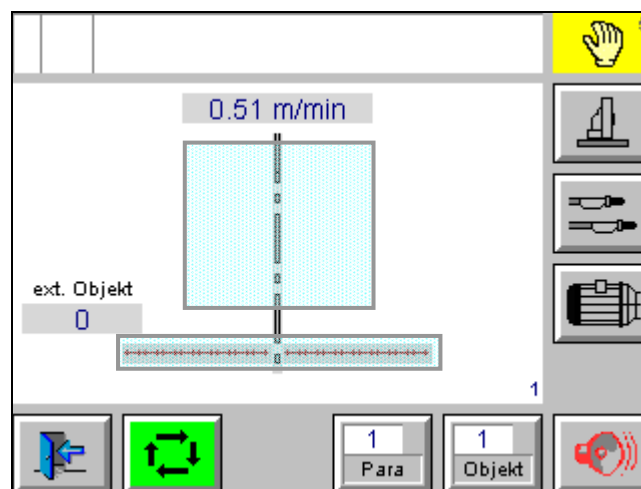
Press the key

The following page is displayed:



Segmentation of the light grid, light grid distance, minimum spraying distance

## Touch fields on main page



Main page



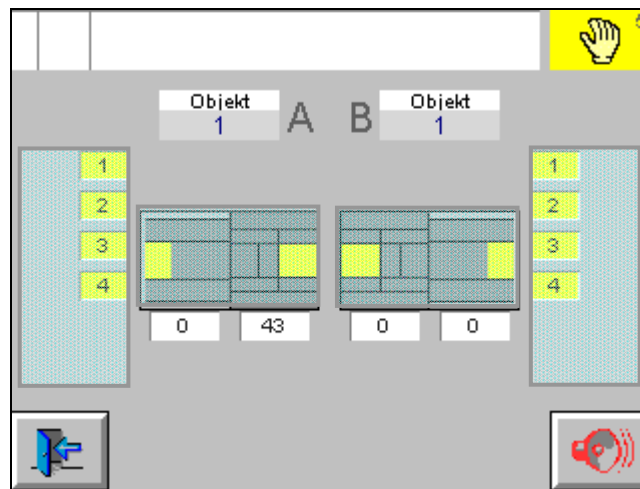
Activated touch key fields



Light grid information

## Touch fields one level lower

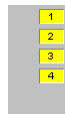
Press the large touch field  
Following page is displayed:



Main page one level lower



Edit axis values, select or deselect axes



Edit gun values and select or deselect, daily correction



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




Start and stop guns

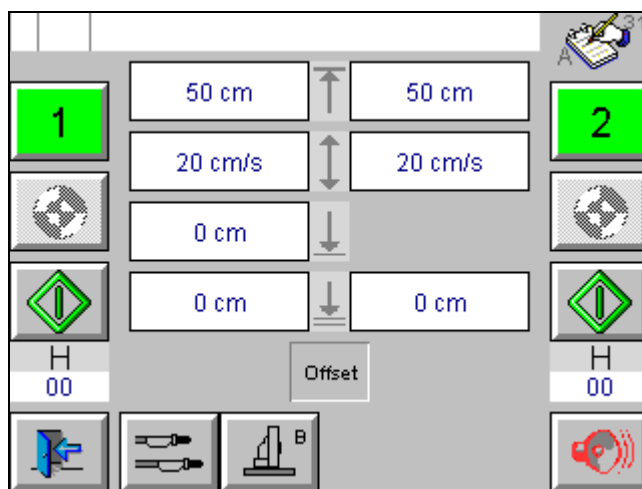


Start and stop axes

## Start and stop axes, select or deselect

Press the key 


The following page is displayed:



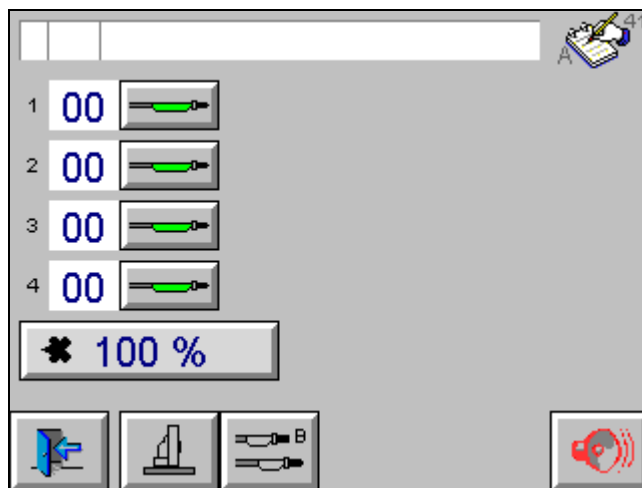
*Edit and start axes*

For details, see chapter "Operating modes"

## Select and deselect guns, daily correction

Press the key 


The following page is displayed:

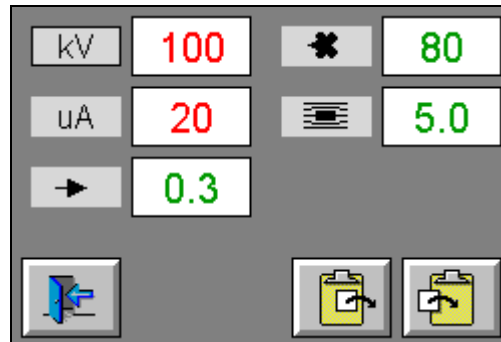


*Select and deselect guns, daily correction*

For details, see chapter "Operating modes"

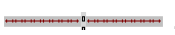
## Edit gun values

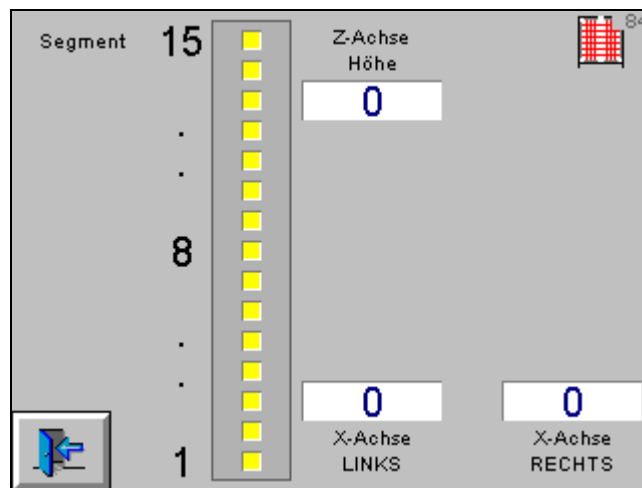
Press the key   
The following page is displayed:



*Edit gun values*

## Check the light grid

Press the key   
The following page is displayed:



*Light grid information*

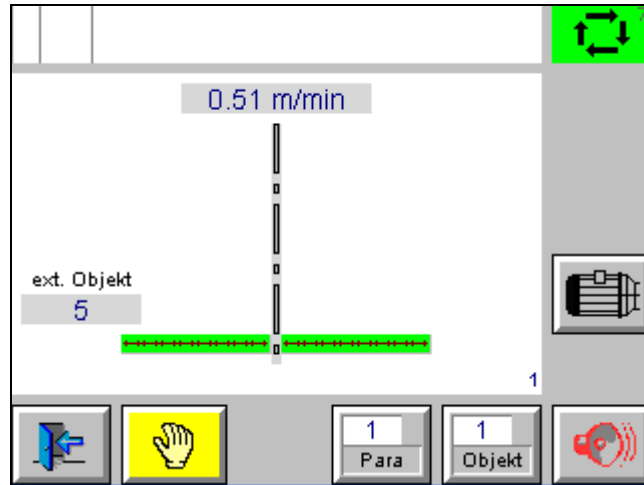
1. Display of the width on the left and on the right
2. Display of the lowest interrupted beam
3. Display of the segments

## Equipment in automatic operation mode



Press the key

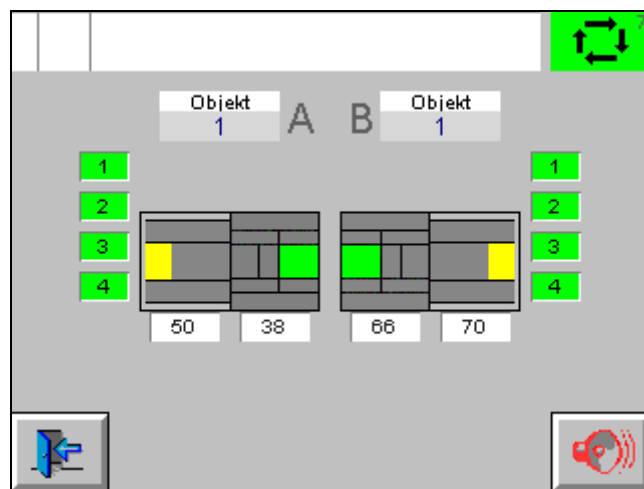
The following page is displayed:



*Automatic operation mode*

The workpieces are coated in a fully automated operating mode.

Guns switch on if required, and the axes travel to the entered positions.

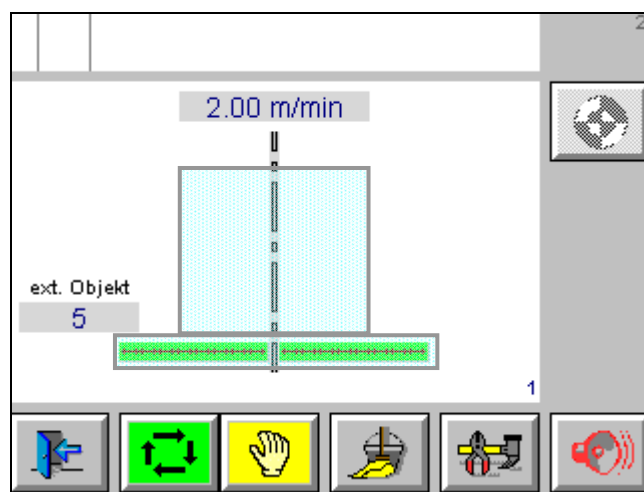


*Automatic operation mode - one level lower*



# Operating modes

## Overview



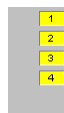
Manual operation page



Activated key fields



Edit axis values, select or deselect axes



Edit and select or deselect gun values, daily correction



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



Start and stop guns



Start and stop axes



Select **Automatic** operating mode



Select **Manual** operating mode



Select **Cleaning** operating mode



Select **Service** operating mode



Information **All Axes are referenced**

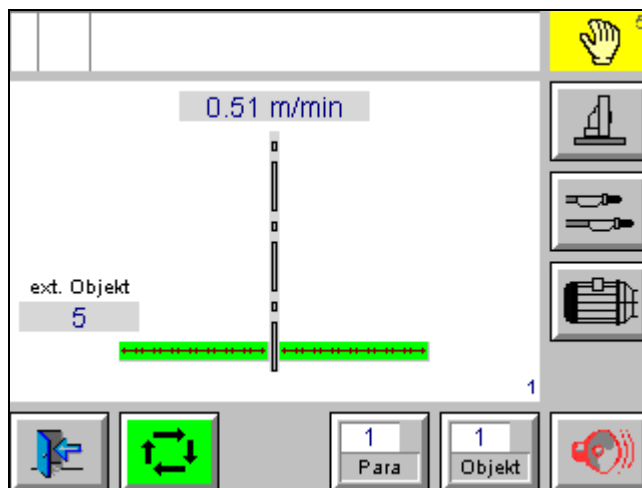


## Manual operating mode



Press the key

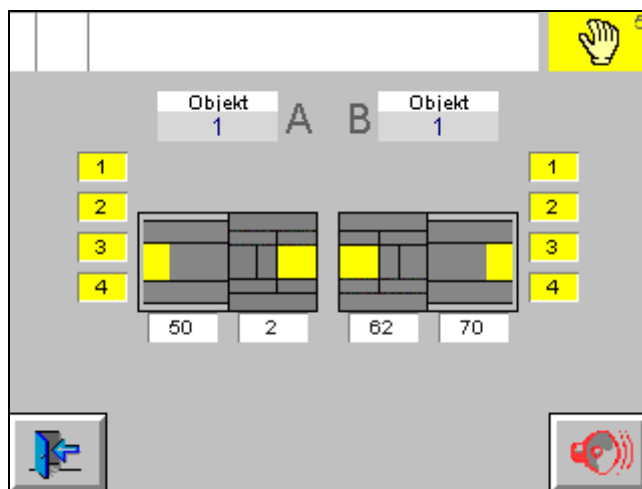
The following page is displayed:



Manual operation main page


Press the large touch field in the middle

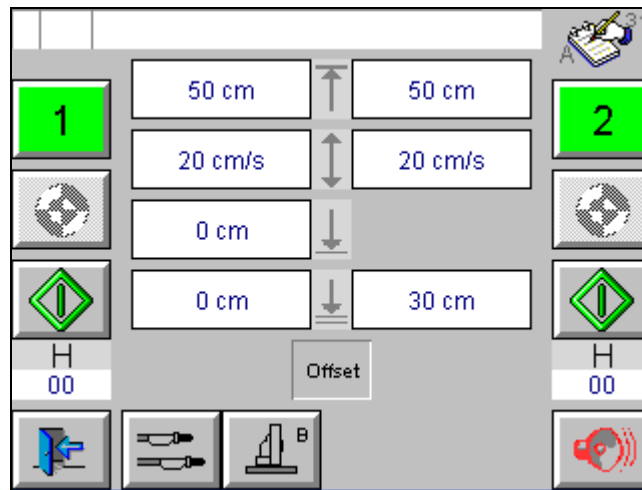
The following page is displayed:







Manual operating mode

## Edit axis values, select or deselect axes

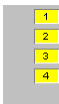

Press the key   
The following page is displayed:

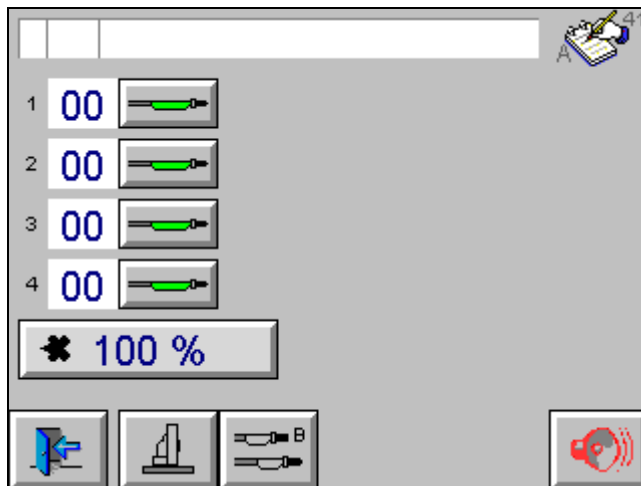


*Edit axis values*

1. Press the key   
The key turns green  and the axis is selected.  
Only selected axes can be started
2. Press the key   
The axes start
3. Press the key   
The axes stop
4. The input fields allow the user to modify the position of the axes

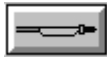
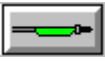
## Select or deselect guns and daily correction

Press the key  or .  
The following page is displayed:




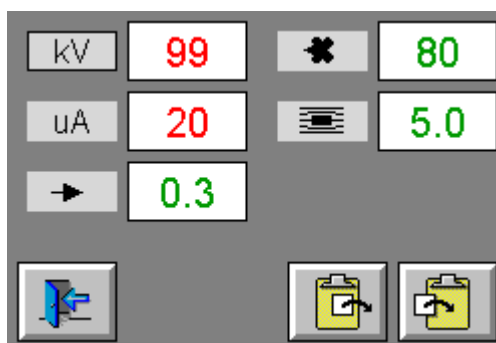
*Daily correction, select or deselect guns*

### Select or deselect guns

1. Press the key .  
The key turns green  and the gun is selected
2. The input fields allow the user to modify the gun values

### Edit gun values


Press the key .  
The following page is displayed:




*Edit gun values*

1. Modify daily correction value for each station
2. Select or deselect guns

### High voltage test

Press the key 

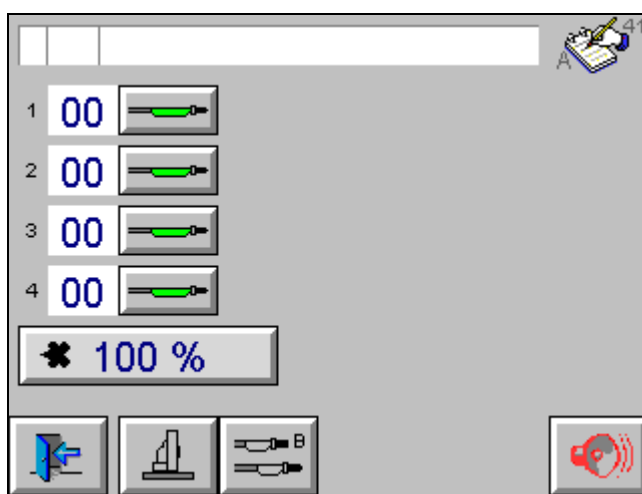
The key turns red 

1. The main magnetic valve will be closed
2. The axes will be switched off



### Copy gun data

1. Press the key   
The data is copied to the clipboard



2. Press the key   
The following page is displayed:





Copy gun data


3. Press the key  of the gun on which the data shall be copied
4. Press the key   
The data will be copied


### Axes start independently from the conveyor


1. Press the key   
  
The key turns green  and the activated conveyor is simulated


2. Press the key   
  
The key turns green  and the reciprocators move, if the axes are selected

## Guns start independently from the conveyor

1. Press the key 

The key turns green  and the activated conveyor is simulated

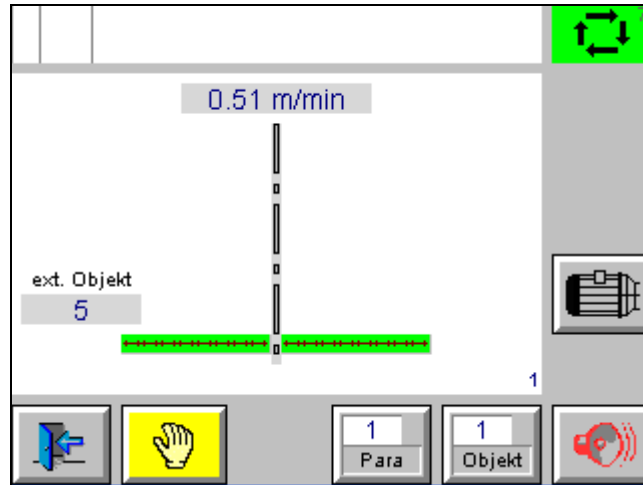
2. Press the key 

The key turns green  and the guns spray powder, if the guns are selected

## Automatic operation mode

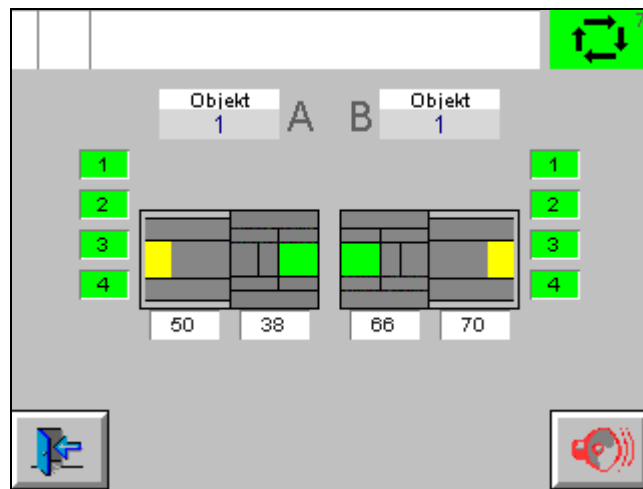


Press the key  
The following page is displayed:



*Automatic operation main page*


Press the large touch field in the middle  
The following page is displayed:




*Automatic operation mode - one level lower*

- The guns and axes start automatically based on the information from the light grid or 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
- See chapter "Manual operation mode"

## Simulation of the CAN bus sensor


Press the key 

The key turns green  and the activated conveyor is simulated.

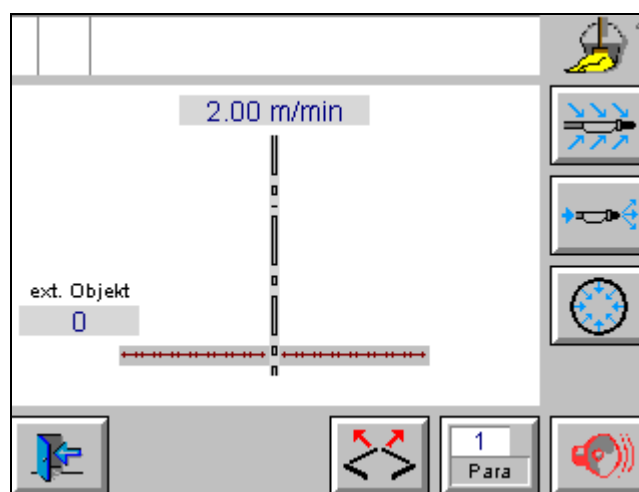
This means, the CAN bus sensor can be defective, or the conveyor is not ready for operation. By this CAN-Bus sensor simulation, the coating operation still can take place.

Press the key  **2.00 m/min** to enter the conveying speed.

## Cleaning operation


Press the key 

The following page is displayed:



*Cleaning operation main page*

1. If the system is equipped with doors, these have to be closed first

2. Press the key 

The **external gun cleaning** is started and the key turns green




The X axes travel into the booth to their final position.

The Z axes travel to the set height of the cleaning position.

Once the X axes reached the position, the waiting period runs down.


Subsequently, the X axes travel out of the booth and the outer cleaning valves are opened.


3. Press the key 

The **internal gun cleaning** is started and the key turns green

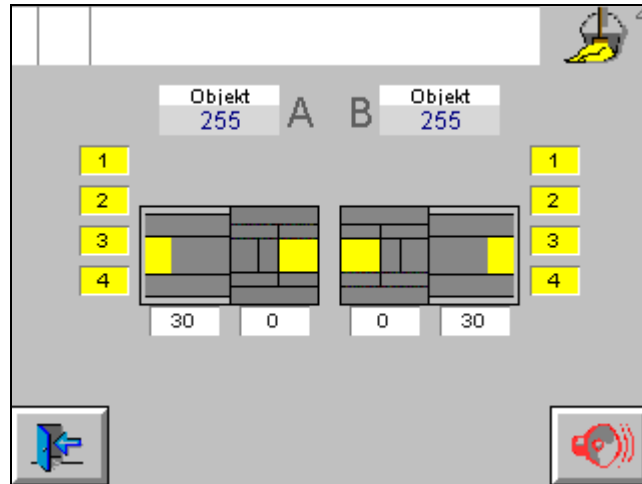


The X axes travel into the booth and the powder center receives the release to blow out the hoses and guns.


4. Press the key 

The ring rinsing switches on and the key turns green 

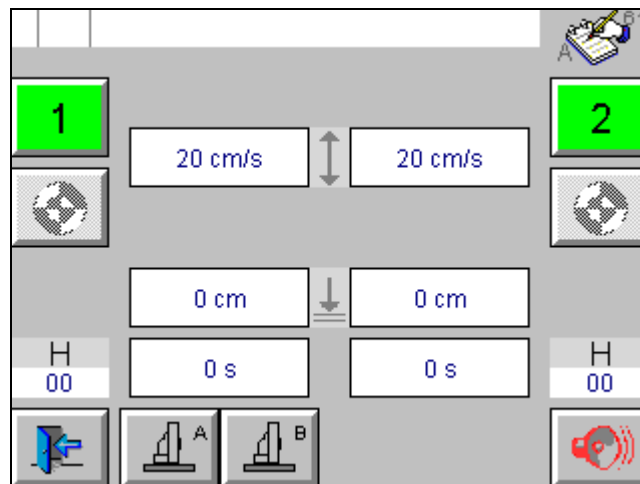
5. Press the large touch field in the middle  
Following page is displayed:



*Cleaning operation one level lower*

Press the key 

The following page is displayed:



*Cleaning positions of the axes*

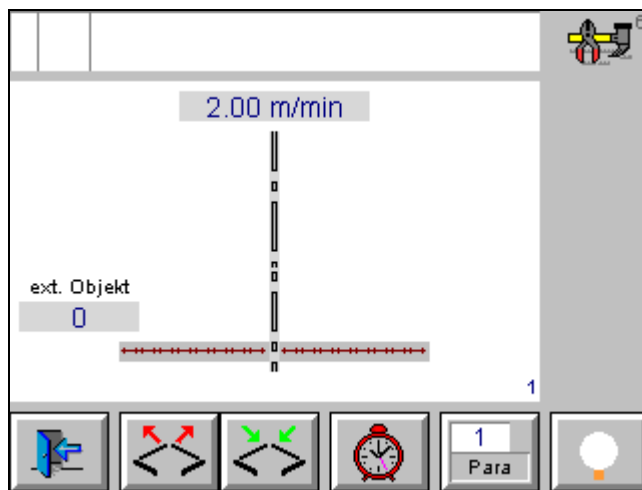
- Enter the cleaning positions and speed
- Enter the waiting time for the external cleaning



## Service operation




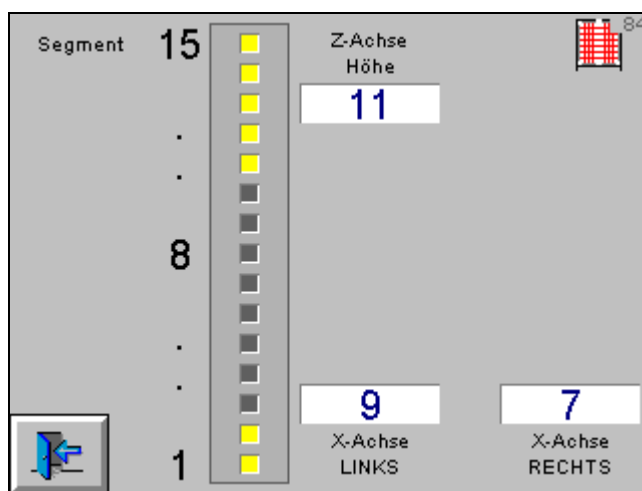
Press the key   
The following page is displayed:



*Main page service*

## Check the light grid

Press the key   
The following page is displayed:



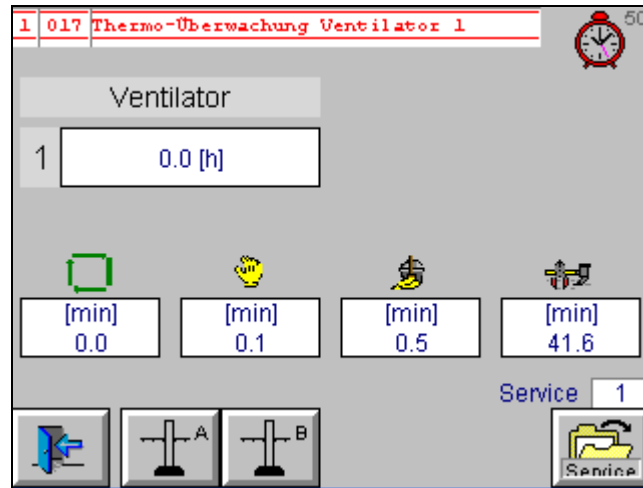
*Light grid information*

- Display of the width on the left and on the right
- Display of the lowest interrupted beam
- Display of the segments

## Administration of operating hours



Press the key  
The following page is displayed:

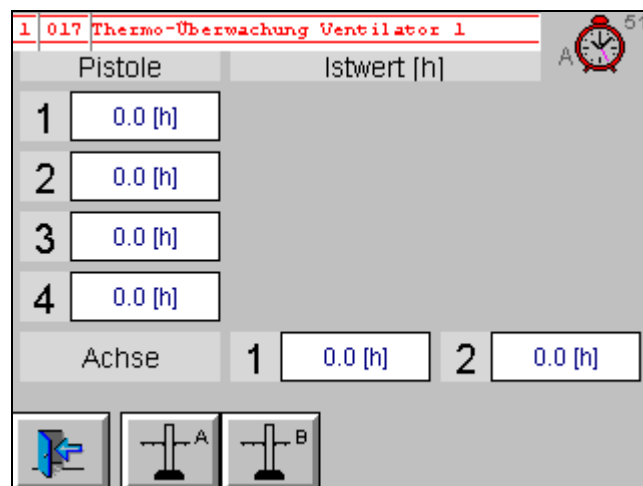


Main page operating hours

- Operating hours of the different operating modes are displayed
- Operating hours fan
- Operating hours axes
- Operating hours guns





Press the key  
The following page is displayed:



Operating hours

Press the key

The following page is displayed:

Betriebsdaten		
Sollwert [h]	Istwert [h]	
0.0 [h]	0.0 [h]	
	Total [h]	
	0.0 [h]	

*Operating data*

1. Set the nominal value  
When the actual value reaches the nominal value, an error message is displayed



2. Press the key   
The actual value is added to the total value and set to zero

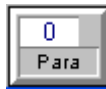


Lamp test



Parameterization of the equipment

## Parameterization



Press the key  
The following page is displayed:



*Main page parameterization*



- General parameters
- Station parameters
- Calibration of the CAN bus sensor
- Booth parameters
- Light grid parameters for gun switch-off
- Light grid parameters for stroke switching



## General parameters



Press the key

The following page is displayed:

1 .	allgemein			
1 . 4	Minimale Taktzeit	2 s	1 . 5	Verzögerung Achsen ein 1 s
1 . 6	Verzögerung Pistolen ein	1 s	1 . 7	Spülimpuls 10 s
1 . 8	Impulslänge Blinker ein	0.5 s	1 . 9	Impulslänge Blinker aus 0.5 s
1 . 10	Verzögerung Meldungen	30 s		

General parameterization

### General information

- Minimum pulse time,  
Time until "conveyor does not run" - signal for switch-off of axes and guns
- Delay axes on,  
Time until "conveyor runs" - signal for switch-on of the axes
- Delay guns on,  
Time until "conveyor runs" - signal active for switch-on of the guns
- Rinsing pulse,  
Rinsing time of the powder guns in the gap.
- Pulse length warning light on  
Time until error light and alarm turn off
- Pulse length warning light off  
Time until error light and alarm turn on
- Delay of messages  
Time from the occurrence of an error to the display on the screen

## Station parameters



Press the key  
The following page is displayed:

## Starting points of axes and guns



Press the key  
The following page is displayed:

Pistole		Startpunkt [cm]	
1	100		
2	100		
3	100		
4	100		
Achse		1	2
		100	100


*Starting points*

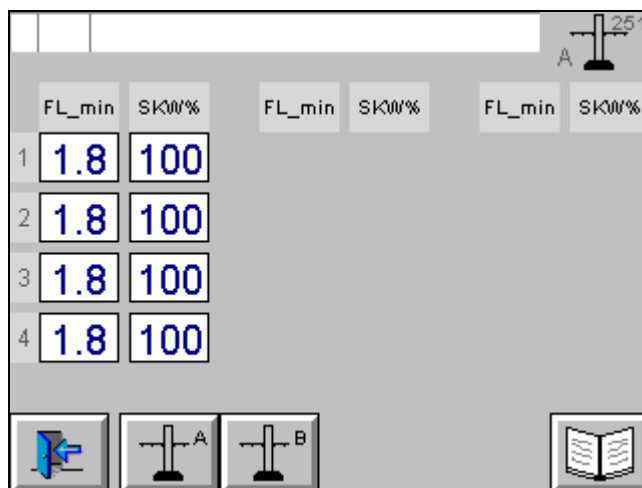
Adjust starting points, pretravel and overtravel:

1. Modify starting points for each gun
2. Modify starting points for each axis

## Powder hose length correction



Press the key   
The following page is displayed:




	FL_min	SKW%
1	1.8	100
2	1.8	100
3	1.8	100
4	1.8	100

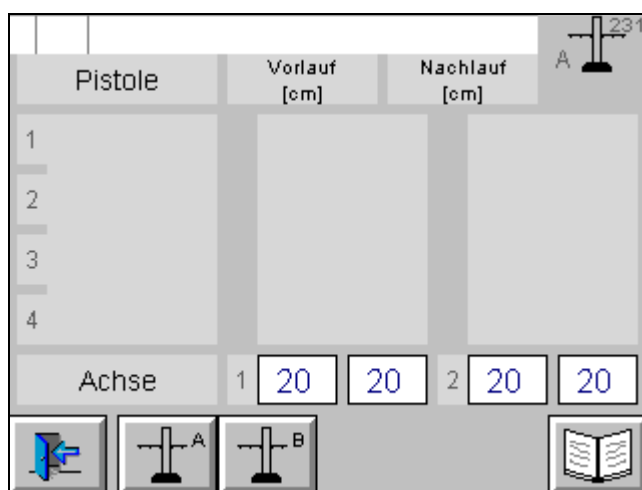
*Powder hose length correction*

1. Determine and enter the minimum powder output (FL\_min) and correction value (SKW%) in accordance with the OptiTronic CG02 operating instructions

## Pretravel and overtravel of axes and guns



Press the key   
The following page is displayed:



	Pistole	Vorlauf [cm]	Nachlauf [cm]
1			
2			
3			
4			

*Pretravel and overtravel of axes and guns*

1. Adjust pretravel and overtravel for each axis
2. Adjust pretravel and overtravel of the guns

## Calibration of the CAN bus sensor



Press the key

The following page is displayed:

Var.	Label	Value	Action
1.4	Messstrecke	2000 mm	Start/Stop
1.5	Messstrecke	2000 mm	Start
1.6	aktuelle v Förderer	0.00 m/min	Start
1.7	Durchmesser Antriebswelle	0 mm	Start

*Calibration of the CAN bus sensor*

Four calibration options are available:

1. Calibrating a measuring section of 2 meters by start/stop key
  2. Calibrating a measuring section of 2 meters with the indication of the time needed for it by pressing the start key
  3. Calibrating by indicating the current conveying speed and by pressing the start key
  4. Calibrating by indicating the drive shaft diameter and by pressing the start key
- Adjust the preceding sign of the CAN bus sensor





## Light grid segmentation, masking the light grid



Press the key

The following page is displayed:

Pistolengruppe		 1  06	
1	000000000001111	5	111111111111111
2	000000001111000	6	111111111111111
3	000001111000000	7	111111111111111
4	111110000000000	8	111111111111111
Maskierung		111111111111111	

Light grid evaluation for gun shutdown

- Light grid distance is the distance between two light grid widths
- Spraying distance is the shortest spraying distance needed on the equipment

## Light grid segmentation, light grid distance, minimum spraying distance



Press the key

The following page is displayed:

Pistolengruppe		 1  07	
9	111111111111111	13	111111111111111
10	111111111111111	14	111111111111111
11	111111111111111	15	111111111111111
12	111111111111111		
Lichtgitterabstand		20 cm	Sprühabstand
		20 cm	

Light grid distance and spraying distance

## Various parameters



Press the key

The following page is displayed:

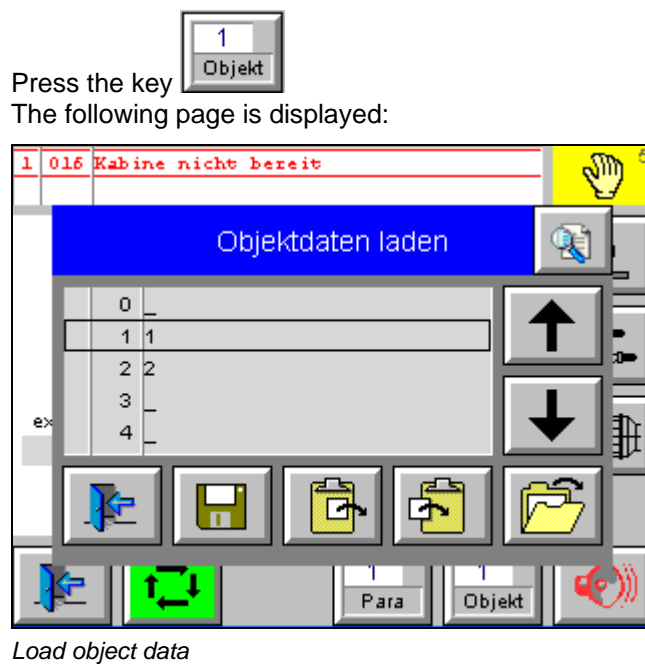
Kontrolldistanz	1000 cm	Ausblendfenster	0 cm
Spüldistanz	20 cm	Lücke	200 cm
Aussen-Beschichtung	10 cm	Vorlauf	10 cm
Innen-Beschichtung	-10 cm	Nachlauf	-10 cm
Objekt	30 cm	Objekt	30 cm






*Various parameters*

- Check distance:  
Allows to control the pollution or functionality of the light grid or light barrier
- Rinsing distance:  
If there is no object during the set distance, the powder hoses are rinsed, if rinsing function is activated
- Window hiding feature:  
Hooks or hangers can be hidden
- Gap:  
If there is no object detected during this distance, the X axes travel out of the booth and the outer cleaning valves blow off the guns
- Pretravel and overtravel:
  - Guns external coating
  - Guns internal coating
  - Object

# Object data administration

## Load and save object data




	Line up
	Line down
	Save object data
	Copy data to clipboard
	Copy data from clipboard

## Copy and insert object data

1. Select object data with the arrow keys




*Load object data*


2. Press the key  Object data is loaded

3. Press the key  Object data is copied to the clipboard

4. With help of the arrow keys , select the object to which the data shall be copied from the clipboard

5. Press the key  Object data is loaded

6. Press the key  Object data is copied to the current object

7. Press the key  Object data is saved

## Name object data

The screen keyboard is opened by pressing the table field. With the help of this, the record can be inscribed.



*Indicate object data*



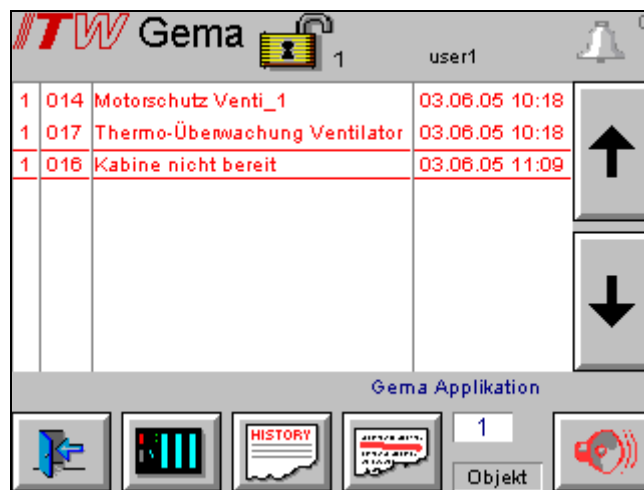
# Error display

## Main page error display

Press the key 

1	016	Kabine nicht bereit
---	-----	---------------------

  
The following page is displayed:



Error page



Line up



Line down



Display error history



Delete inactive error messages from the list and acknowledge errors



Display of the active CAN bus devices

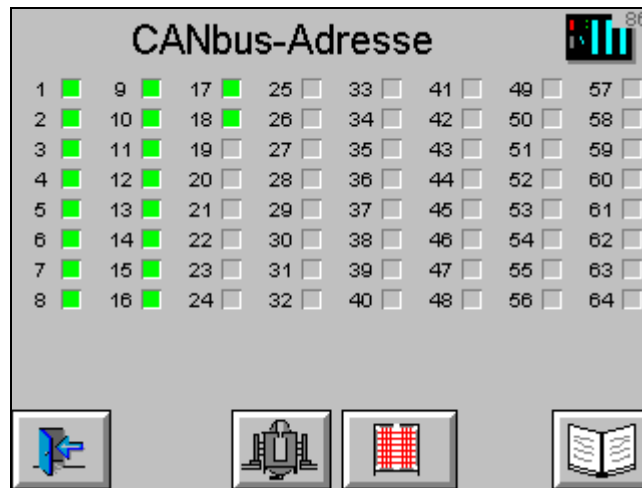


Acknowledge error

## Active CAN bus devices



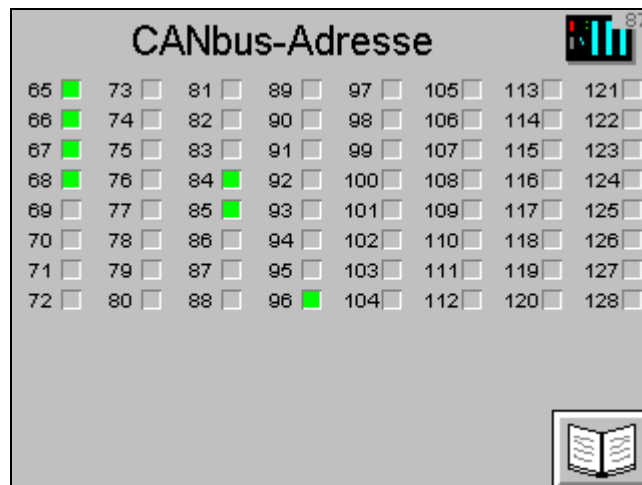
Press the key  
The following page is displayed:



Active CAN bus devices - first page



Press the key  
The following page is displayed:



Active CAN bus devices - second page

Fields colored in green show active CAN bus devices.



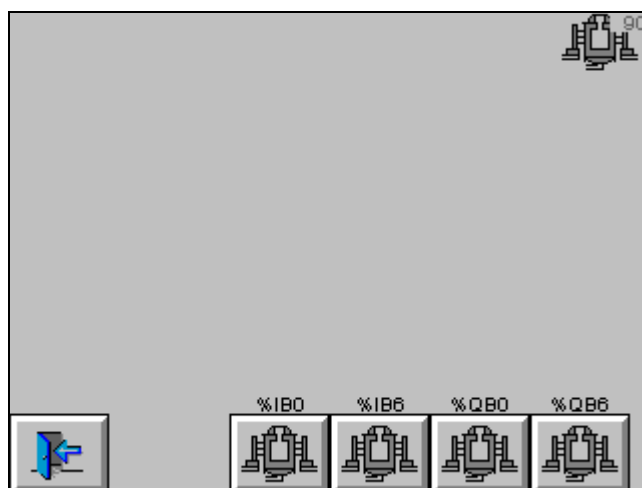
Device	Address	Address
	Decimal	Hexadecimal
OptiTronic CG02 gun control unit	1 - 64	1 - 3F
OptiMove CR04 reciprocator control unit	65 - 80	41 - 50
Powder center CPU	82	52
Booth knot	84	54
Light grid knot	85	55
Sensor	96	60
Powder center panel	97	61

## Check digital inputs and set and delete outputs



Press the key

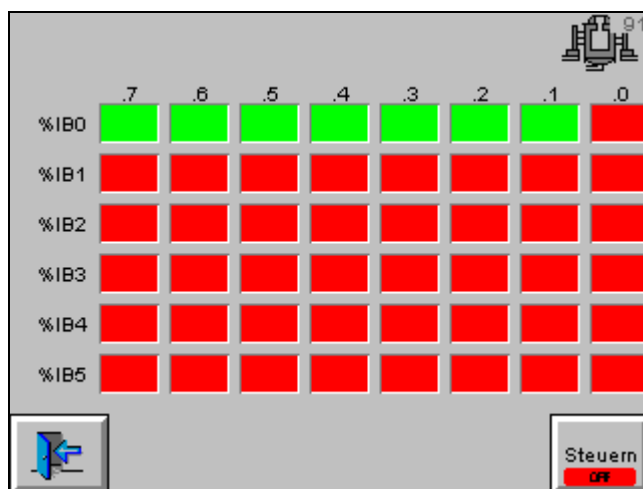
The following page is displayed:



*Main page - digital inputs and outputs*



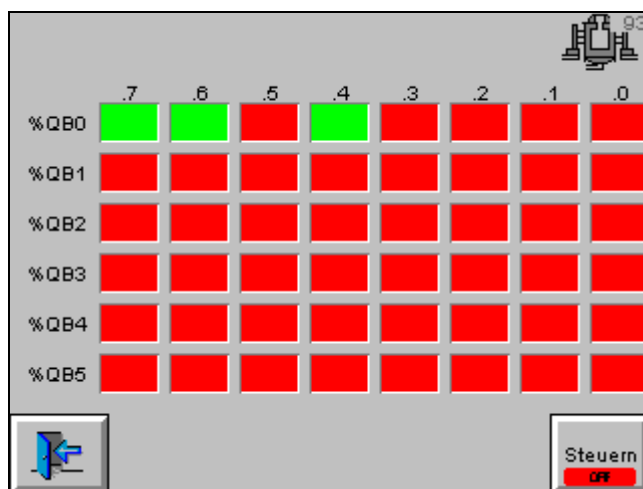
Press the key  
The following page is displayed:



Input page



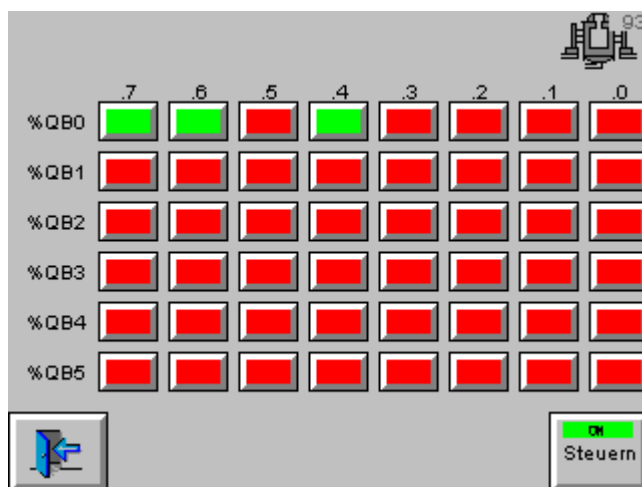
Press the key  
The following page is displayed:



Input page



Press the key  
The following page is displayed:



*Set and delete digital outputs*


Press the key   
The key turns green  and the output is set.



# User levels and access

---

## Log-in

1. Press the key  and a dialogue window will pop up
2. Enter name (USER) and password (e.g. user3 and u3)
3. If the name and password correspond, the system acknowledges



- it with the symbol
4. If the key is pressed again, the system logs out and the user panel is locked
  5. The set-up of new user profiles is done on the first page under **Konfig**

---

## User level 0



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

---

## User level 1



- No configuration possible
- Plant parameters and object-related data (gun and axis data) can be modified
- After 30 minutes, the system logs out automatically

---

## User level 2



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

---

## User level 3



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

---

## No user level



Logged out status

# Plant configuration

---


## General information

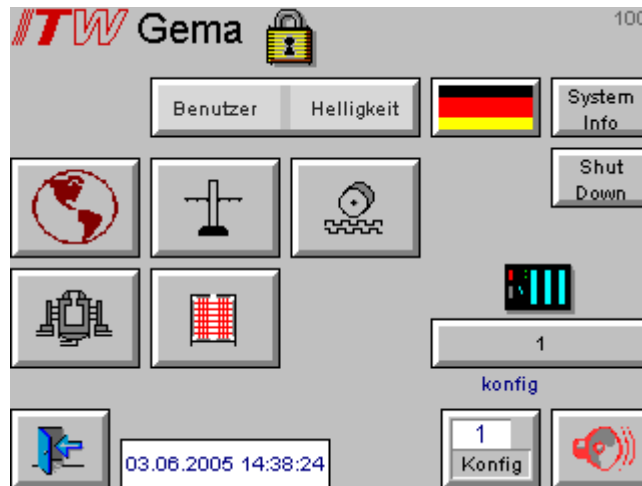


*Start page*

## Adjustments

### Time, date, language, user, brightness

Press the key   
The following page is displayed:



Main page configuration

1. Set time
2. Select system language German / English  
Important: restart OptiControl CM21
3. Select project language  
The following languages are available:



Languages

4. Show all users
5. Define new users
6. Delete users
7. Change password of current user
8. Adjust brightness
9. End visualization
10. System information



11. Select the input/output assignment option
12. Load or copy the configuration  
Backup of the configuration is filed under "99 Backup"



General configuration parameters of the plant



Station definition, axes and guns with system parameters



Release the four available calibration options of the CAN bus sensor



Booth definition

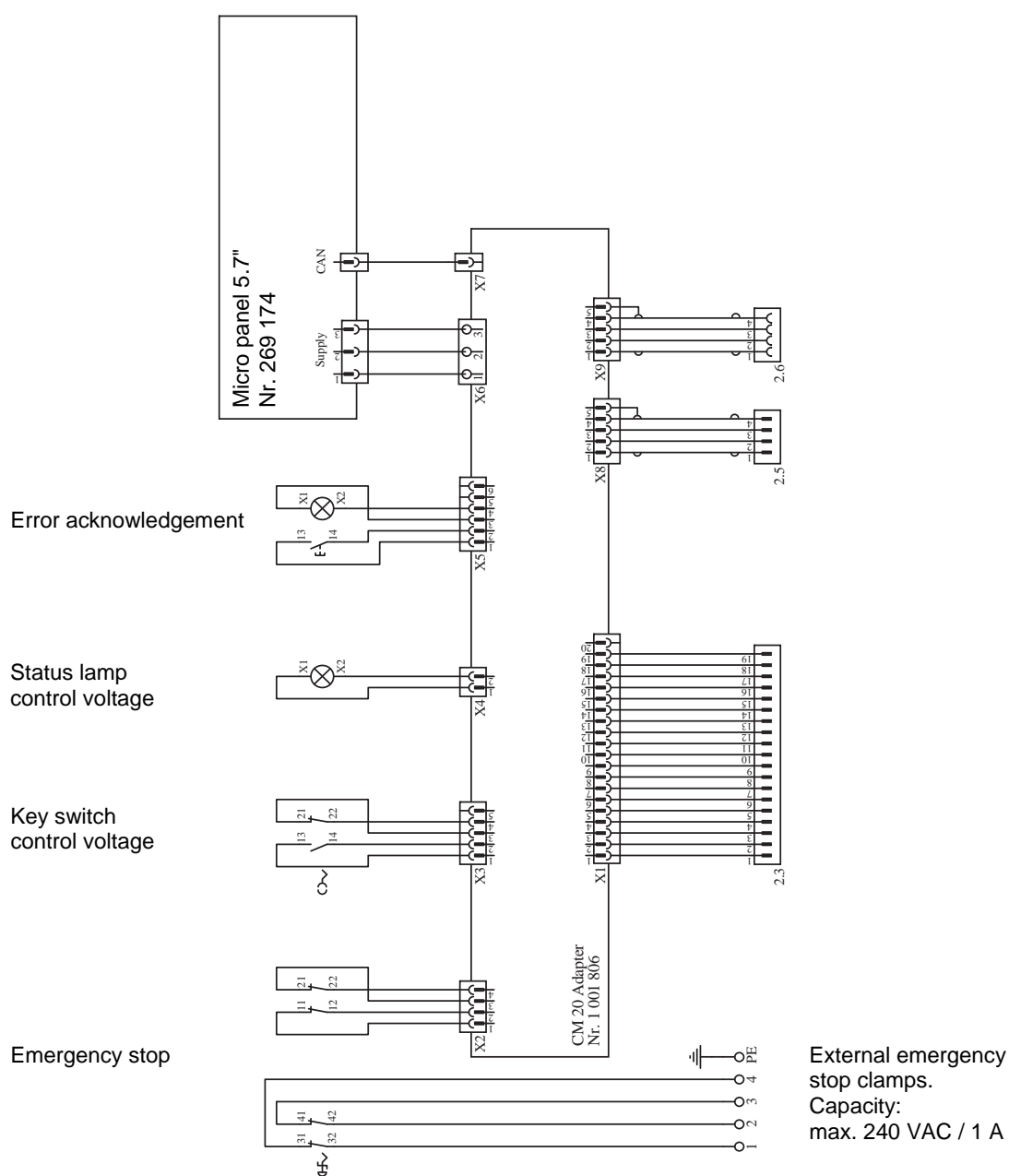


Set type of object recognition



# Schematic diagrams

## Wiring diagram



OptiControl CM21 - wiring diagram



# 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 CM21  
**Serial no.** 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

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

The wear 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!**

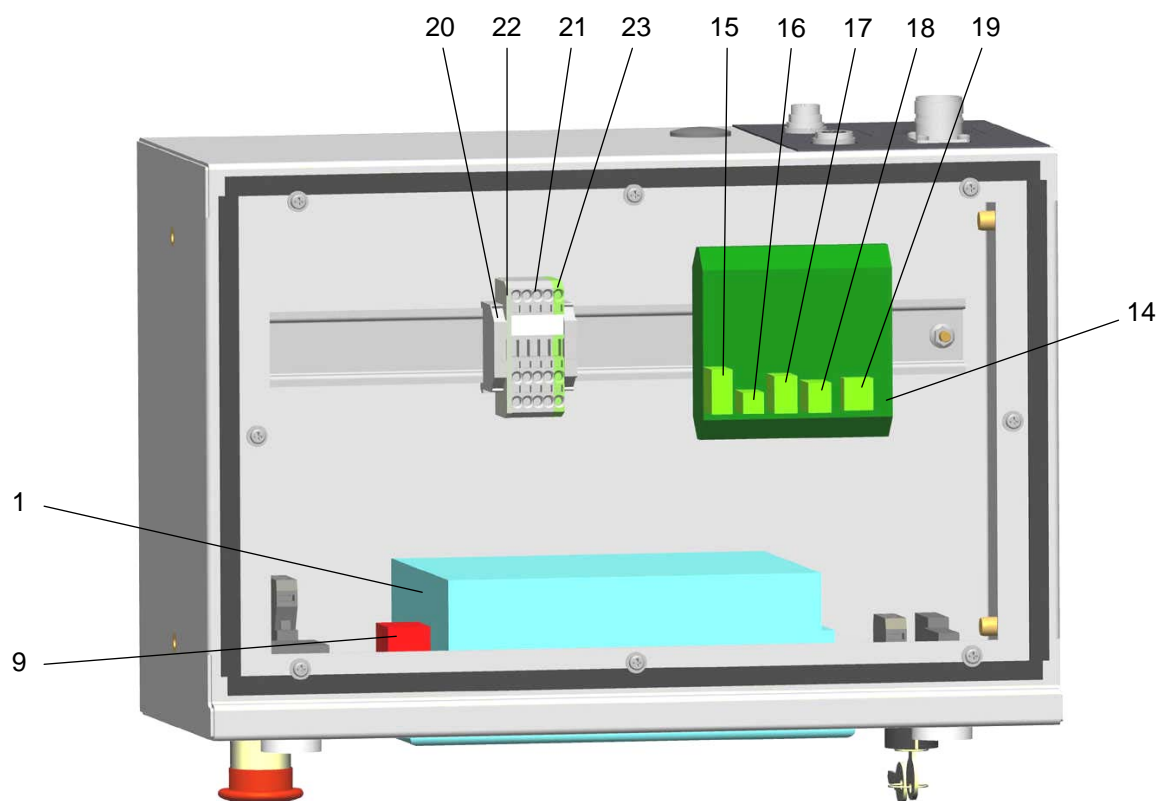
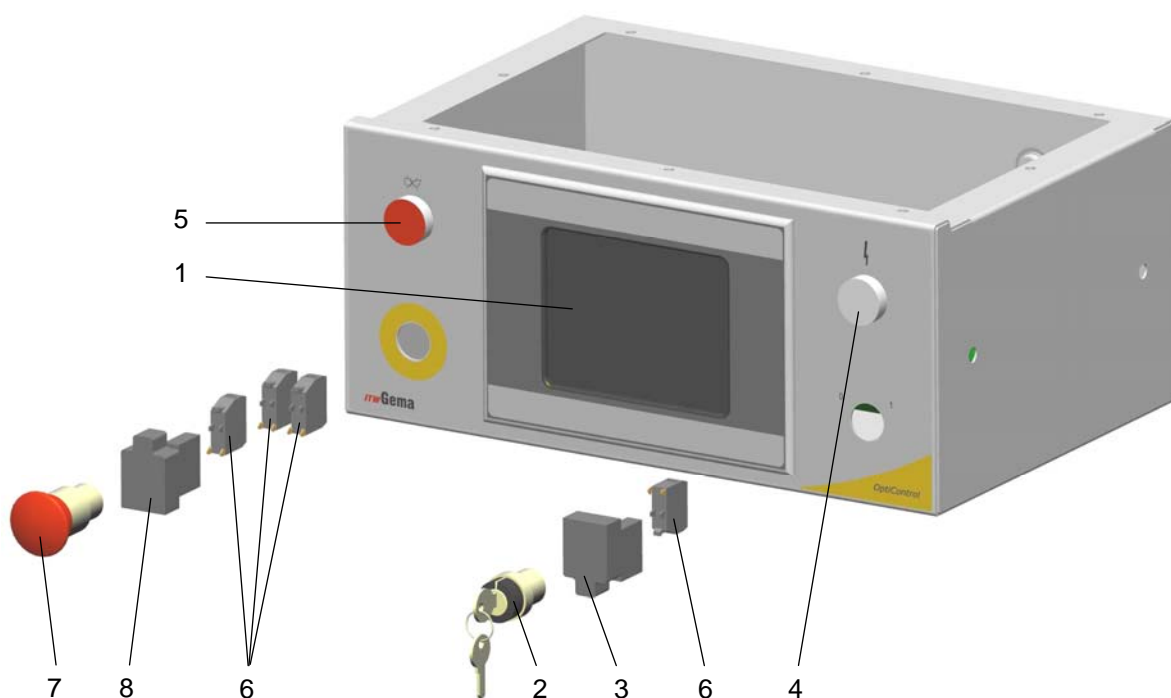
Only original Gema spare parts should be used as the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!

---

## OptiControl CM21 - spare parts list

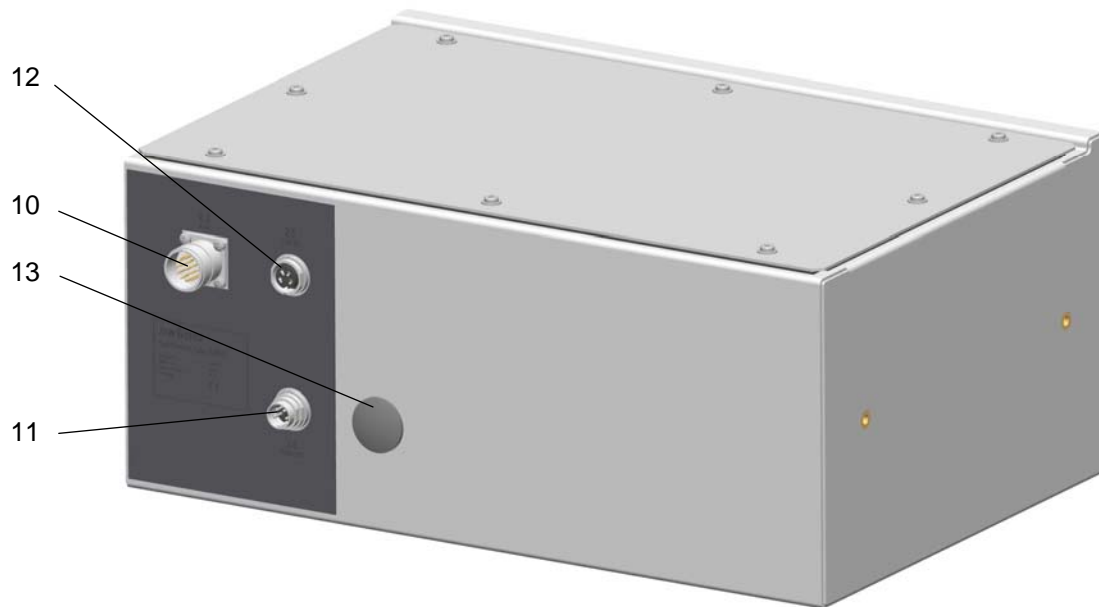
	OptiControl CM21 - complete	1002 350
1	Micro Touch Panel - MC2-5,7", complete	1008 968
2	Key switch 3, central position	268 038
3	Switch lower part - complete, maker	267 821
4	Warning lamp - 24 VDC, white	268 070
5	Illuminated push button - red	267 880
6	Standard auxiliary switch - ZBE-102, breaker	267 805
7	Emergency stop button - Ø 40 mm	267 856
8	Switch lower part - complete, breaker	268 160
9	Internal CAN connection CM21	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	CM21 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

## OptiControl CM21 - spare parts



OptiControl CM21 - spare parts

## OptiControl CM21 - spare parts (rear side)



*OptiControl CM21 - spare parts (rear side)*



