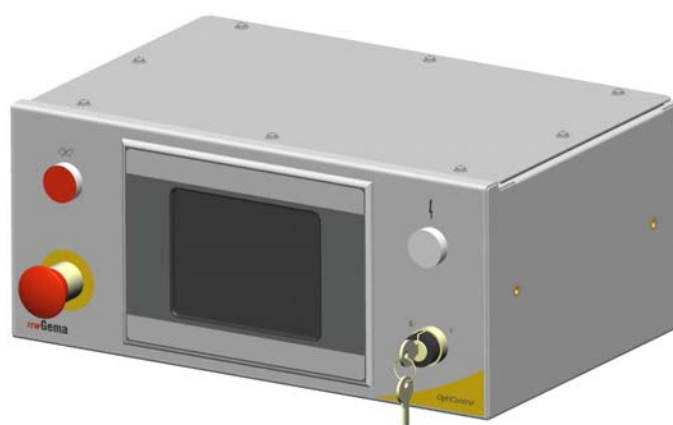

Operating instructions and spare parts list

OptiControl CM-20

TW
Gema



Documentation OptiControl CM-20

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ITW Gema AG
Mövenstrasse 17
9015 St. Gallen
Switzerland

Phone: +41-71-313 83 00
Fax.: +41-71-313 83 83

E-Mail: info@itwgema.ch
Homepage: www.itwgema.ch

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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiControl CM-20 control unit.

These safety regulations must be read and understood before the OptiControl CM-20 control unit is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the ITW 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!**


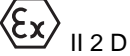
Useful tips and other information

Conformity of use

1. The OptiControl CM-20 is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.
2. Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the OptiControl CM-20 is to be used for other purposes or other substances outside of our guidelines then ITW Gema AG should be consulted.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of

conformity of use. The OptiControl CM-20 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 a particular operation) is forbidden until it has been established that the OptiControl CM-20 has been set up and wired according to the guidelines for machinery (98/37 EG). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to OptiControl CM-20 exempts 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 must be observed.

Explosion protection	Protection type	Temperature class
 	IP54	T6 (zone 21) T4 (zone 22)

Technical safety regulations for stationary electrostatic powder spraying equipment

General information

The powder spraying equipment from ITW Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Improper use of the controlling device can lead to accidents, malfunction or damage to the control itself.
2. Before every start-up check the equipment for operational safety (regular servicing is essential)!
3. Safety regulations BGI 764 and VDE regulations DIN VDE 0147, Part 1, must be observed for safe operation.
4. Safety precautions specified by local legislation must be observed.
5. The plug must be disconnected before the machine is opened for repair.
6. The plug and socket connection between the powder spraying equipment and the mains network should only be taken out when the power is switched off.
7. The connecting cable between the controlling device and the spray gun must be set up so that it cannot be damaged during

operation. Safety precautions specified by local legislation must be observed!

8. Only original ITW-Gema spare parts should be used, because the explosion protection will also be preserved that way. Damage caused by other parts is not covered by guarantee.
9. If ITW-Gema powder spraying equipment is used in conjunction with machinery from other manufacturers then their safety regulations must also be taken into account.
10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!
11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!
12. As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!



WARNING!

We emphasize that the customer himself is responsible for the safe operation of equipment. ITW-Gema is in no way responsible for any resulting damages!

Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the "Safety regulations"-chapter. The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The control devices for the spray guns must only be set up and used in zone 22. Only the spray gun should be used in zone 21.

The powder spraying equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The operating instructions and the necessary closing down procedures must be followed before any work is carried out concerning the set-up, start-up, operation, modification, operating conditions, mode of operation, servicing, inspection or repairs.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shut-down. Individual components can be turned off during operation by using the appropriate switches.

Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method which will negatively influence the technical safety of the powder spraying equipment is to be avoided.

2. The operator should ensure that no non-authorized personnel works on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).
3. For dangerous materials, the employer has to provide an operating instructions manual, which specifies the dangers arising for humans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an understandable form and in the language of the persons employed, and has to be kept in a suitable place in the working area.
4. The operator is under obligation to check the powder spraying equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.
5. The operator is obliged to check that the powder spraying equipment is only operated when in satisfactory condition.
6. As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).
7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.
8. No safety devices should be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take place immediately after the maintenance or repair work is finished. The powder spraying device must be turned off while servicing is carried out. The operator must train and commit the responsible personnel to this.
9. Activities such as checking powder fluidization or checking the high-voltage spray gun etc. must be carried out with the powder spraying equipment switched on.

Notes on special types of hazard

Power

It is necessary to refer once more to the danger of life from high-voltage current if the shut-down procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying device is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - see "Earthing".

Grounding/Earthing

All electricity conducting parts and machinery found in the workplace (according to DIN VDE 0745, part 102) must be earthed 1.5 meters either side and 2.5 meters around each booth opening. The earthing resistance should not exceed 1 MOhm. The resistance must be tested on a regular basis. The condition of the machinery surroundings as well as the suspension gear must ensure that the machinery remains earthed. If the earthing of the machinery includes the suspension arrangements, then these must constantly be kept clean in order to guarantee the necessary conductivity. The appropriate measuring devices must be kept ready in the workplace in order to check the earthing.

Compressed air

When there are longer pauses or stand-still times between working, the powder spraying equipment should be drained of compressed air. There is a danger of injury, when pneumatic hoses are damaged, and from the uncontrolled release and improper use of compressed air.

Crushing and cutting

During operation, moving parts may automatically start to move in the operating area. It must be ensured that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

Access under exceptional circumstances

The operating firm must ensure that local conditions are met when repairs are made to the electronic parts or when the equipment is restarted so that there are additional measures such as barriers to prevent unauthorized access.

Prohibition of unauthorized conversions and modifications to machines

All unauthorized conversions and modifications to electrostatic spraying equipment are forbidden for safety reasons.

The powder spraying equipment should not be used if damaged, the faulty part must be immediately replaced or repaired. Only original ITW-Gema replacement parts should be used. Damage caused by other parts is not covered by guarantee.

Repairs must only be carried out by specialists or in ITW-Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The ITW Gema AG guarantee would no longer be valid.

Safety requirements for electrostatic powder coating

1. This equipment is dangerous if the instructions in this operating manual are not followed.
2. All electrostatic conductive parts, in particular the machinery within 5 meters of the coating equipment, must be earthed.
3. The floor of the coating area must conduct electricity (normal concrete is generally conductive).

4. The operating personnel must wear electricity conducting footwear (e.g. leather soles).
5. The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.
6. The supplied earthing cable (green/yellow) must be connected to the earthing screw of the electrostatic powder spraying hand appliance. The earthing cable must have a good metallic connection with the coating booth, the recovery unit and the conveyor chain and with the suspension arrangement of the objects.
7. The electricity and powder supply to the hand guns must be set up so that they are fully protected against heat and chemical damage.
8. The powder coating device may only be switched on once the booth has been started up. If the booth cuts out then the powder coating device must be switched off.
9. The earthing of all electricity conducting devices (e.g. hooks, conveyor chains) must be checked on a weekly basis. The earthing resistance should not exceed 1 MOhm.
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturers instructions must be observed when using such cleaning agents.
12. The manufacturers instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, tears) or missing then it should not be used.
14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original ITW-Gema replacement parts should be used.
15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.
16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of 10 g/m³ should be used.

A summary of the rules and regulations

The following is a list of relevant rules and regulations which are to be observed:

Guidelines and regulations, German professional association

BGV A1	General regulations
BGV A2	Electrical equipment and material
BGI 764	Electrostatic coating
BGR 132	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (Guideline "Static Electricity")
VDMA 24371	Guidelines for electrostatic coating with synthetic powder ¹⁾ - Part 1 General requirements - Part 2 Examples of use

Leaflets

ZH 1/310	Leaflet for the use of tools in locations where there is danger of explosion ¹⁾
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EN European standards

RL94/9/EG	The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres
EN 292-1 EN 292-2	Machine safety ²⁾
EN 50 014 to EN 50 020, identical: DIN VDE 0170/0171	Electrical equipment for locations where there is danger of explosion ³⁾
EN 50 050	Electrical apparatus for potentially explosive atmospheres - Electrostatic hand-held spraying equipment ²⁾
EN 50 053 part 2	Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials - Hand-held electrostatic powder spray guns ²⁾
EN 50 177	Stationary electrostatic spraying equipment for flammable coating powder ²⁾
PR EN 12981	Coating plants - Spray booths for application of organic powder coating material - Safety requirements
EN 60 204 identical: DIN 40050	IP-Type protection: contact, foreign bodies and water protection for electrical equipment ²⁾
EN 60 204 identical: DIN VDE 0113	VDE regulations for the setting up of high-voltage electrical machine tools and processing machines with nominal voltages up to 1000 V ³⁾

VDE (Association of German Engineers) Regulations

DIN VDE 0100	Regulations for setting-up high voltage equipment with nominal voltages up to 1000V ⁴⁾
DIN VDE 0105 part 1 part 4	VDE regulations for the operation of high voltage equipment ⁴⁾ General regulations Supplementary definitions for stationary electrical spraying equipment
DIN VDE 0147 Part 1	Setting up stationary electrostatic spraying equipment ⁴⁾
DIN VDE 0165	Setting up electrical equipment in locations in areas with danger of explosion ⁴⁾

***Sources:**

- 1) Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association
- 2) Beuth Verlag GmbH, Burggrafenstrasse 4, D-10115 Berlin 30
- 3) General secretariat, Rue Bréderode 2, B-1000 Bruxelles, or the appropriate national committee
- 4) VDE Verlag GmbH, Bismarckstrasse 33, D-01115 Berlin 12

Product specific security measures

- The installation work, to be done by the customer, must be carried out according to local regulations
- Before starting up the plant a check must be made to ensure that no foreign objects are in the booth or in the ducting (input and exhaust air)
- It must be observed, that all components are grounded according to the local regulations, before start-up

About this manual

General information

This operating manual contains all important information which you require for the working with the OptiControl CM-20 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 CM-20, starting from the following software versions:

Software	Version
Galileo	CM-20 V50
MXPro	CM-20_V50

Function description

Field of application

The OptiControl CM-20 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 CM-20 is particularly suitable for the fully automatic coating of any kind of parts. Also in the case of color changes, the OptiControl CM-20 ideally supports the operator. The OptiControl CM-20 is developed particularly for the operation on the Magic booths.

Technical Data

OptiControl CM-20

General

OptiControl CM-20	
Max. number of guns	24
Gun control unit	OptiTronic CG02
Max. number of reciprocators	4
Reciprocator control unit	CR04
Monitor size	5,7"
Communication	by CAN bus
Operating temperature	0-40°C
Storing temperature	-20-60°C
Protection type	IP54

Electrical data

OptiControl CM-20	
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 CM-20	
Processor	RISC/32 Bit, 400 MHz
Memory	64 MB
Remanent memory	32 kB
Compact Flash-Slot	yes / 1

Display

OptiControl CM-20	
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

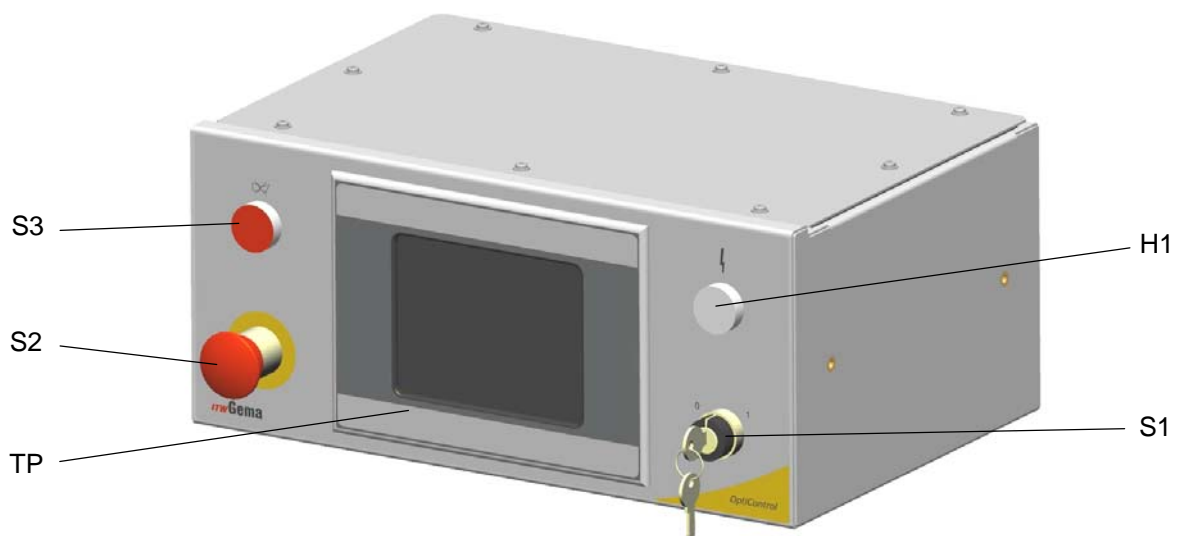
OptiControl CM-20	
Width	406 mm
Depth	275 mm
Height	178 mm
Weight	9.3 kg

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 CM-20 - 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 CM-20 - 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 CM-20 plant control is parameterized, configured and tested at the ITW 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

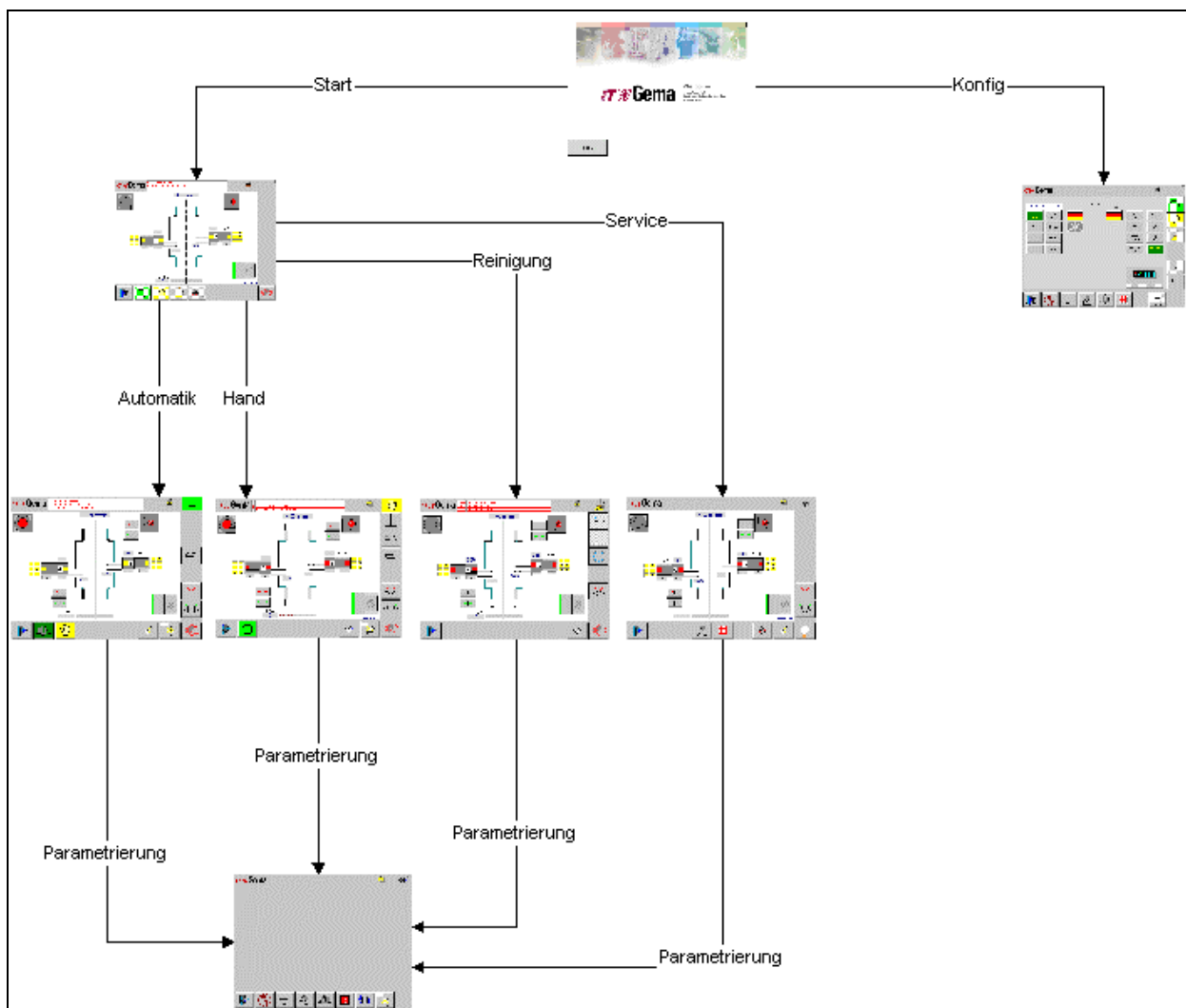
Function keys

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

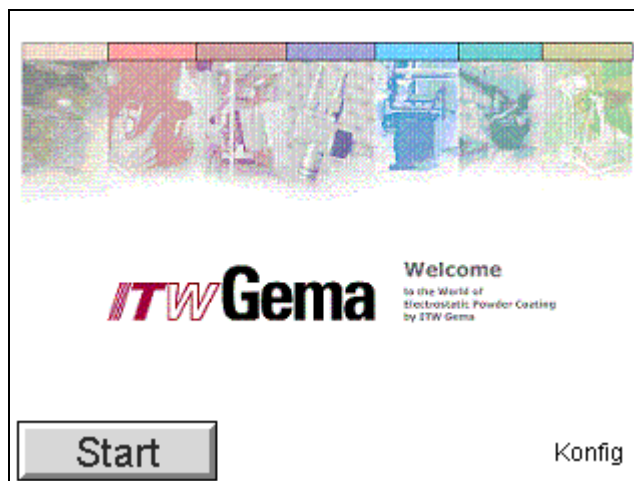


Menu structure

Starting the equipment

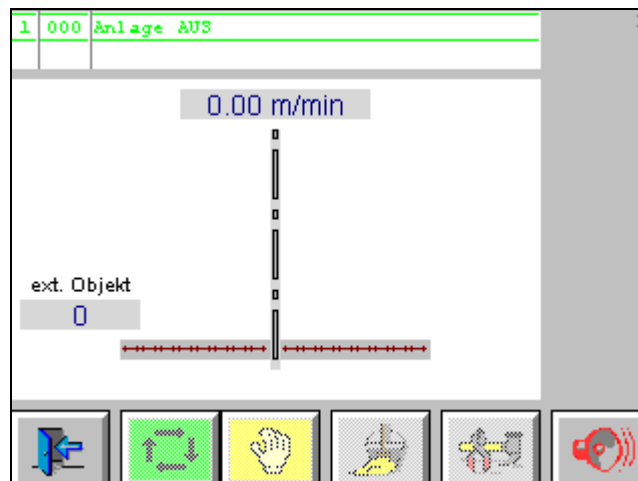
General information

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 CM-20 shines. The OptiControl CM-20 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.



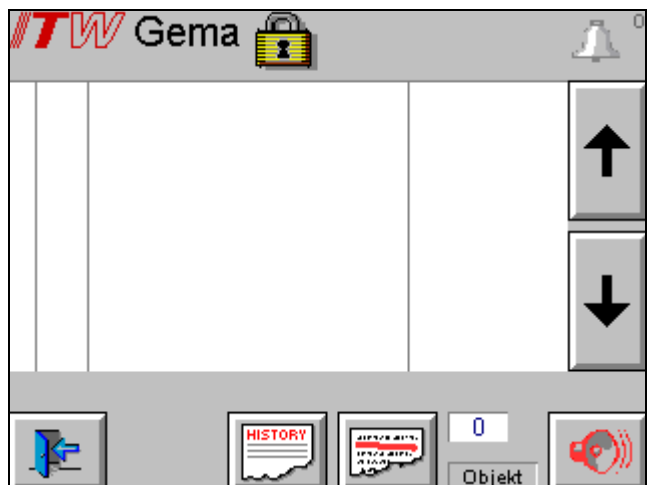
Main page not logged in

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

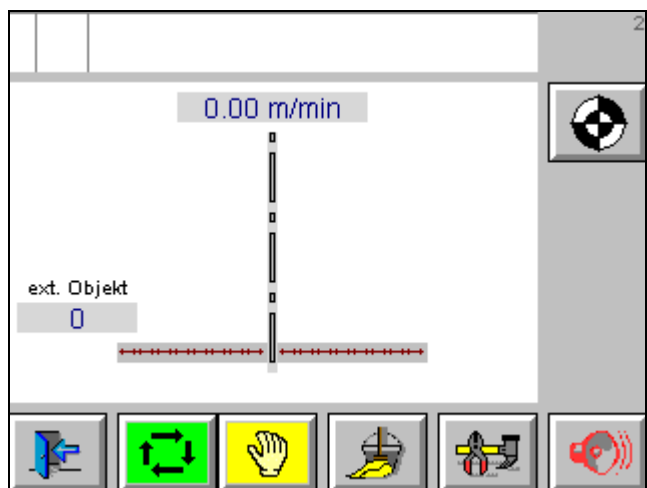
By logging in on user level 3 or lower, the keys are activated for operation.

Log-in



Press the key 
 The following page is displayed:

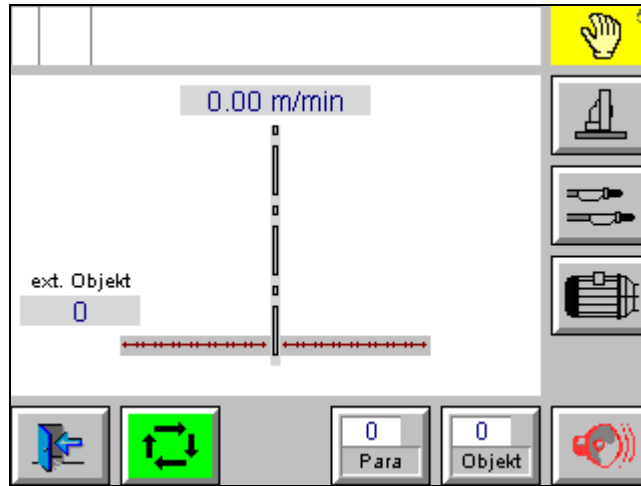


Error page for logging in



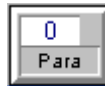
Main page logged in

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:



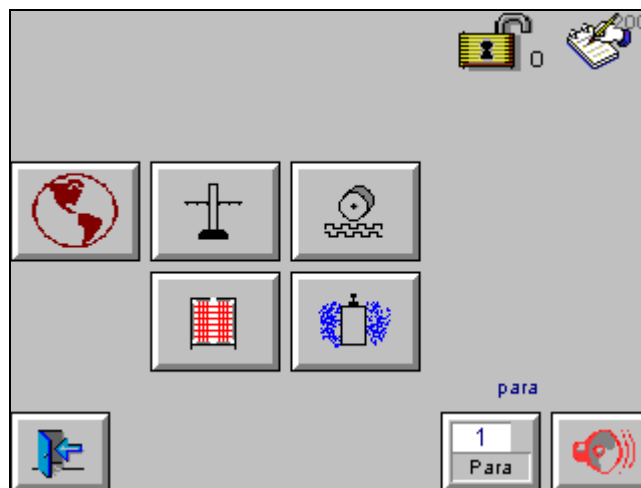
Manual operating mode

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.

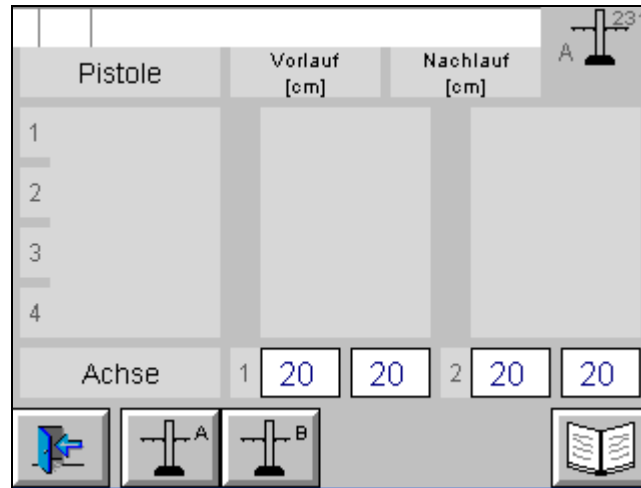
Powder hose length correction

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:



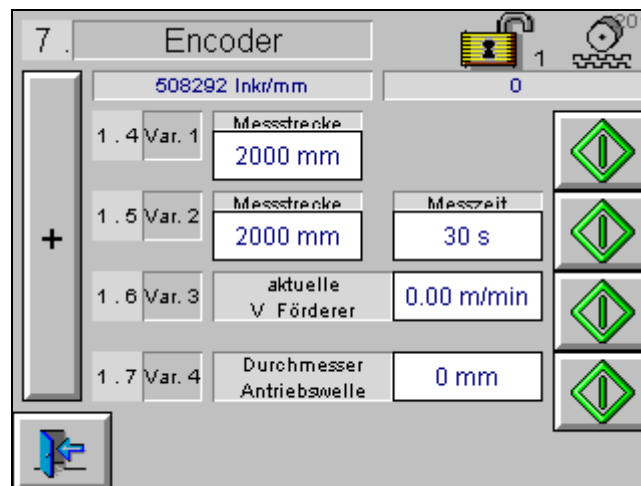
Pretravel and overtravel of axes and guns

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:



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

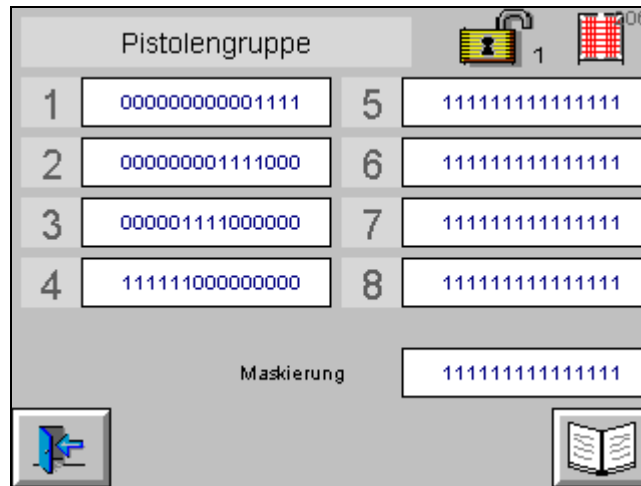
4. Calibrating by indicating the drive shaft diameter and by pressing the start key
5. Adjust the preceding sign of the CAN bus sensor

Segmentation of the light grid, masking the light grid



Press the key

The following page is displayed:



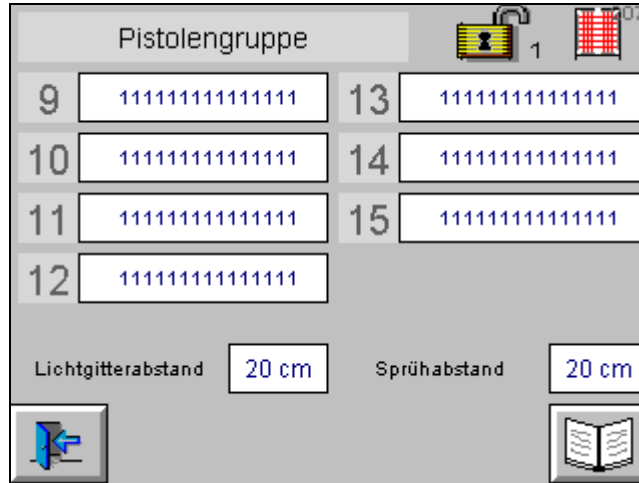
Light grid evaluation for gun shutdown

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

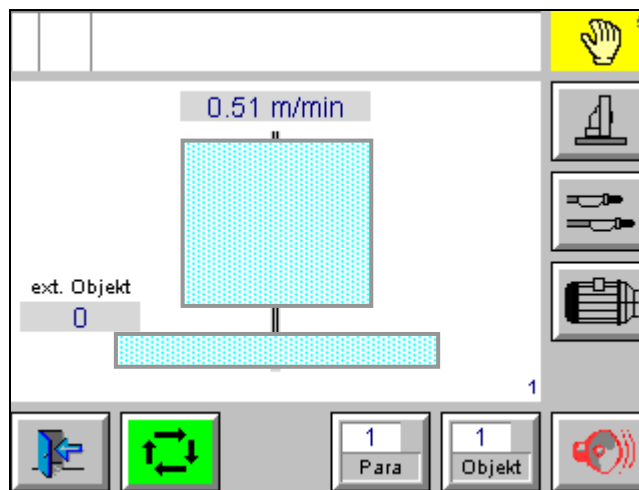


Press the key
The following page is displayed:



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

Touch fields on main page



Main page



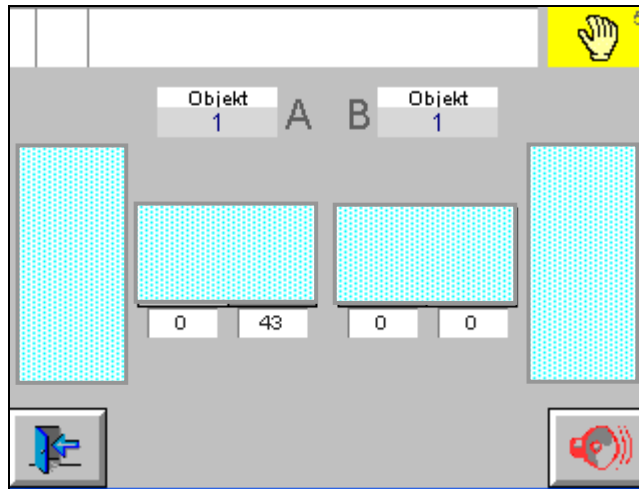
Activated touch key fields



Light grid information

Touch fields one level lower

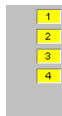
Press the large touch field
Following page is displayed:



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

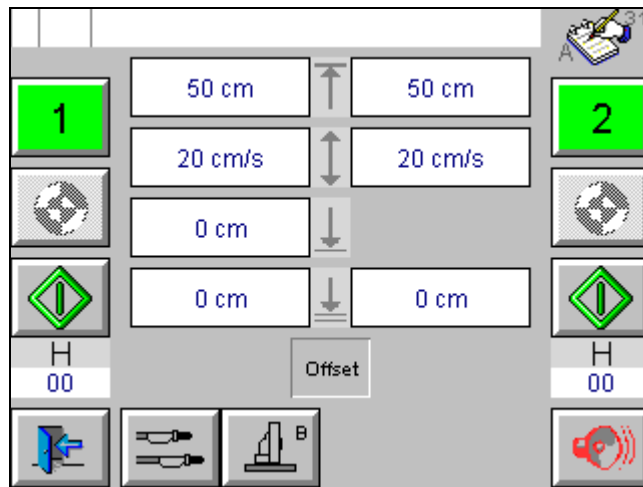


Start and stop axes

Start and stop axes, select or deselect

Press the key 

The following page is displayed:



Edit and start axes

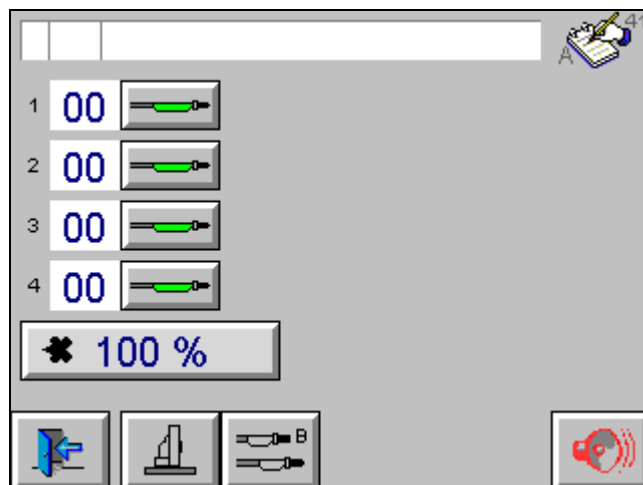
For details, see chapter "Operating modes"

Select and deselect guns, daily correction



Press the key .


The following page is displayed:

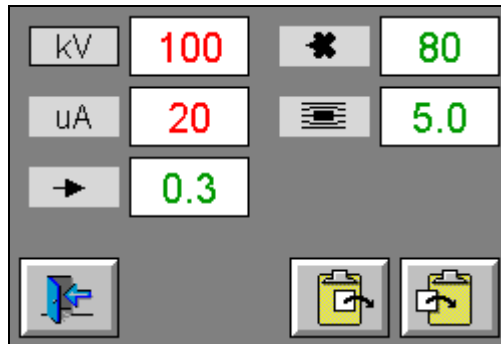


Select and deselect guns, daily correction

For details, see chapter "Operating modes"

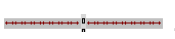
Edit gun values

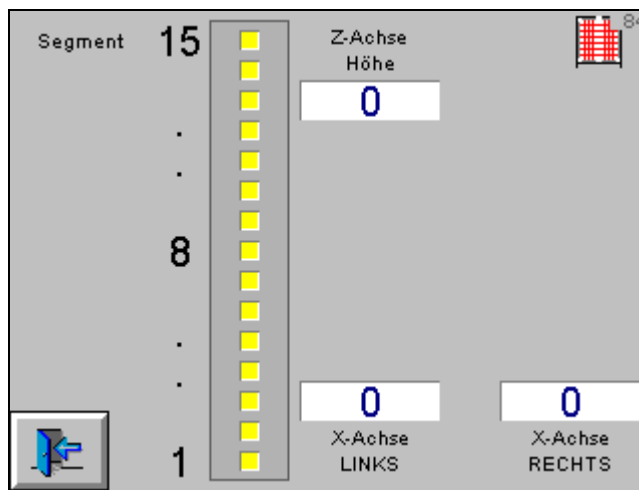
Press the key 
 The following page is displayed:



Edit gun values

Check the light grid


Press the key 
 The following page is displayed:

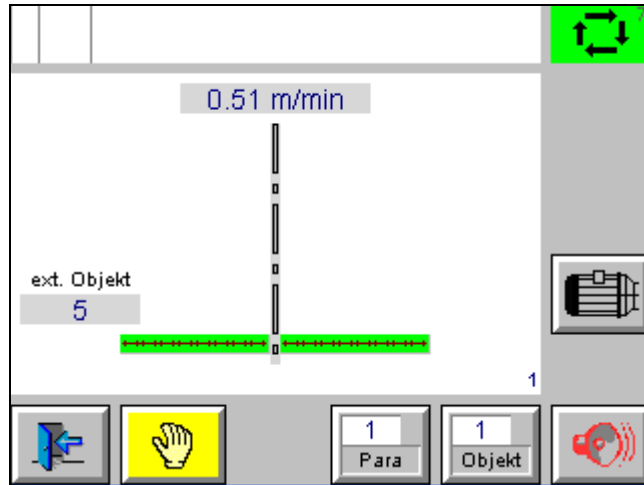


Light grid information

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

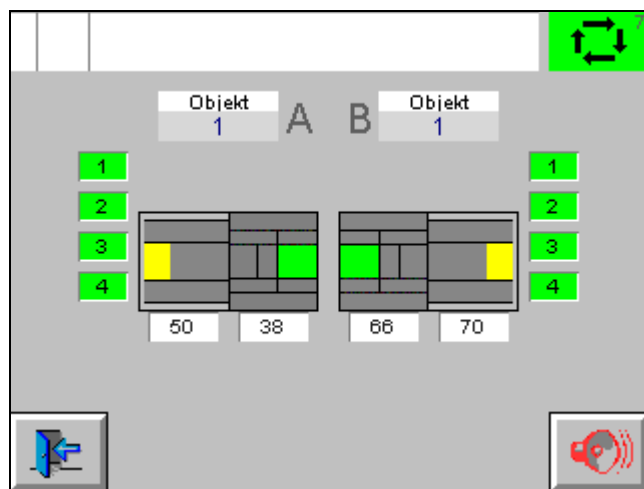
Equipment in automatic operation mode

Press the key 
 The following page is displayed:



Automatic operation mode

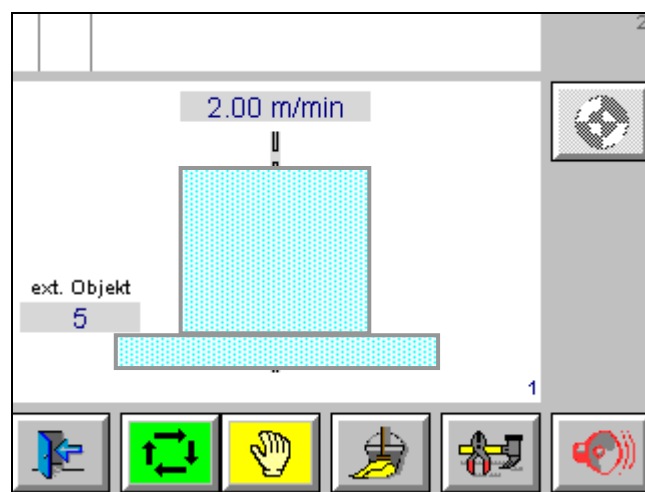
The workpieces are coated in a fully automated operating mode.
 Guns switch on if required, and the axes travel to the entered positions.



Automatic operation mode - one level lower

Operating modes

Overview



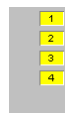
Manual operation page



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

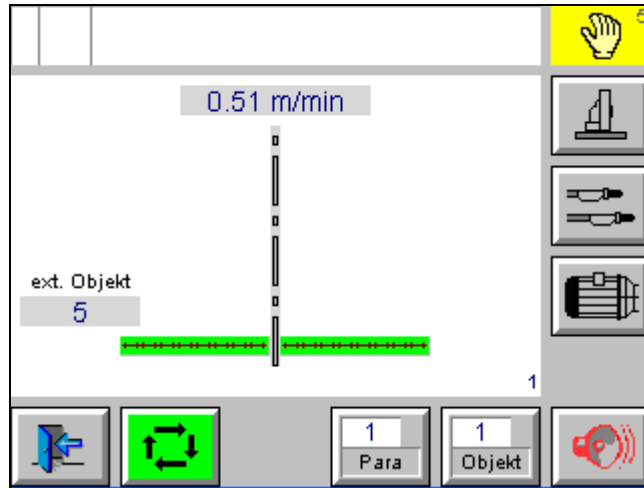


Information **All Axes are referenced**

Manual operating mode

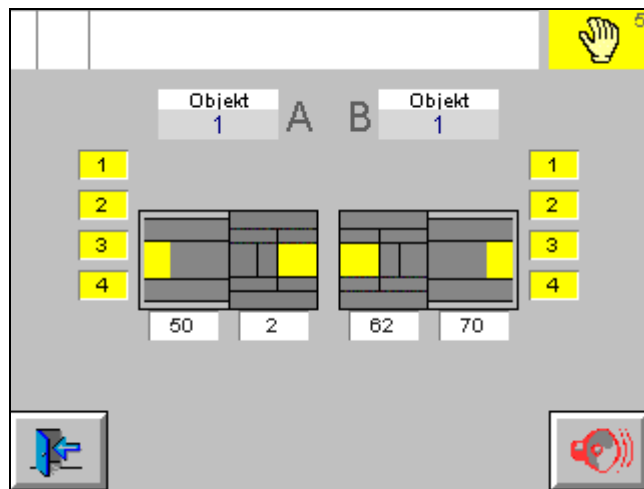


Press the key
The following page is displayed:




Manual operation main page

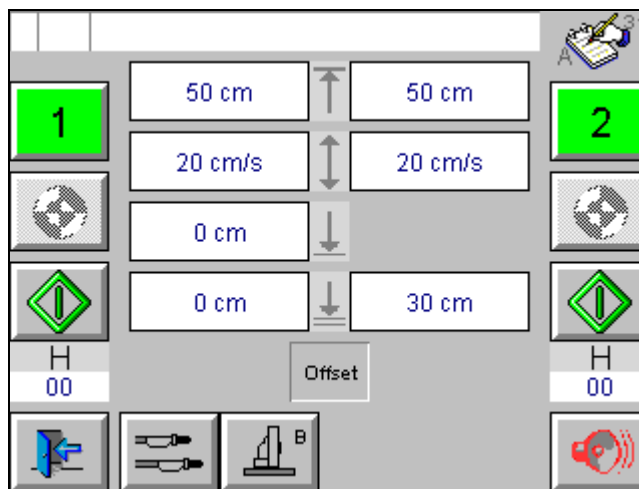
Press the large touch field in the middle
The following page is displayed:







Manual operating mode

Edit axis values, select or deselect axes

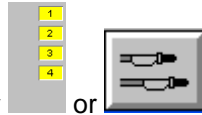
Press the key 
 The following page is displayed:





Edit axis values

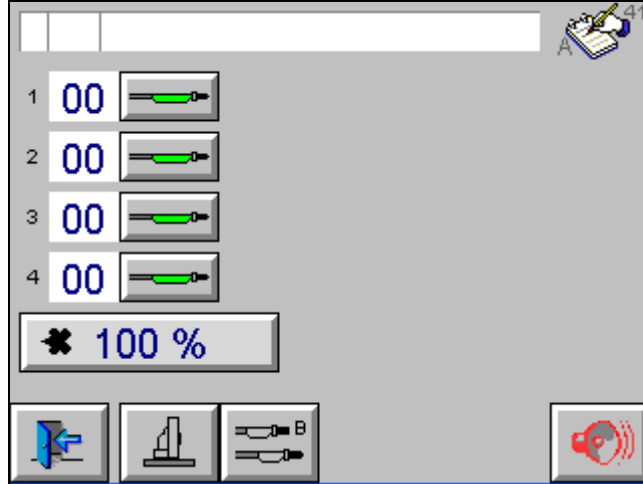
1. Press the key 
 The key turns green  and the axis is selected.
 Only selected axes can be started
2. Press the key 
 The axes start
3. Press the key 
 The axes stop
4. The input fields allow the user to modify the position of the axes

Select or deselect guns and daily correction





Press the key  or 

The following page is displayed:




Daily correction, select or deselect guns

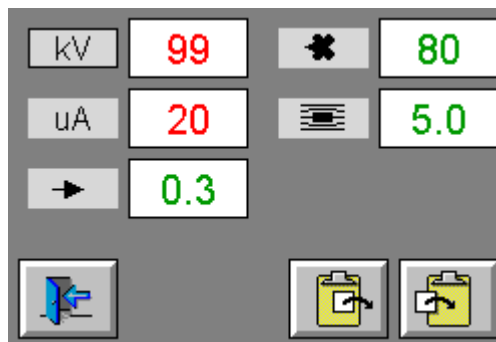
Select or deselect guns

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

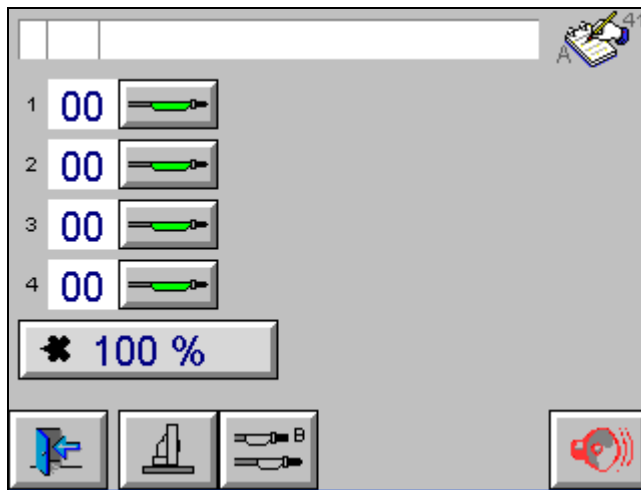
Copy gun data

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

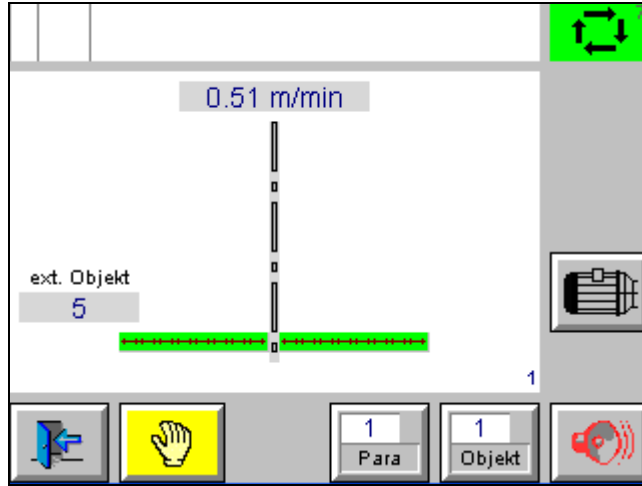
Guns start independently from the conveyor

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

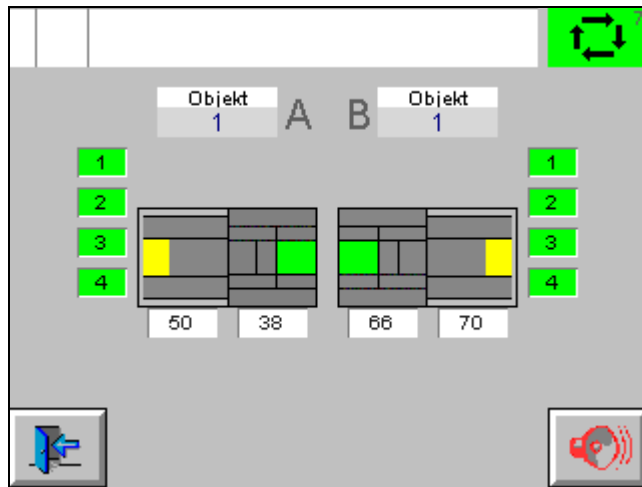


Press the key
The following page is displayed:



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.

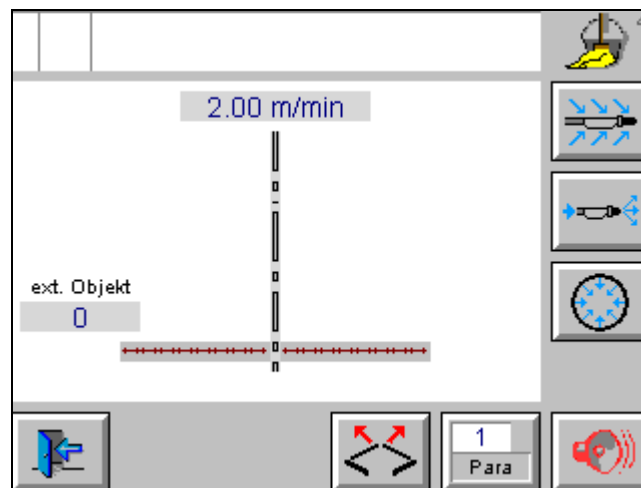
This means, the CAN bus sensor can be defective, or the conveyor is not ready for operation. By this CAN-Bus sensor simulation, the coating operation still can take place.

Press the key  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

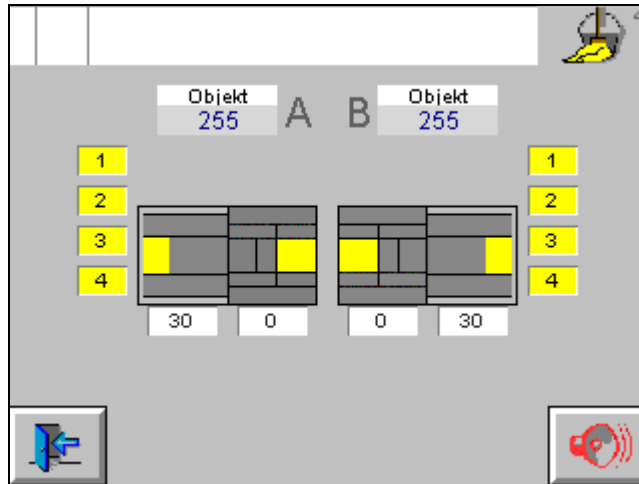


The X axes travel into the booth and the powder center receives the release to blow out the hoses and guns.


4. Press the key 

The ring rinsing switches on and the key turns green 

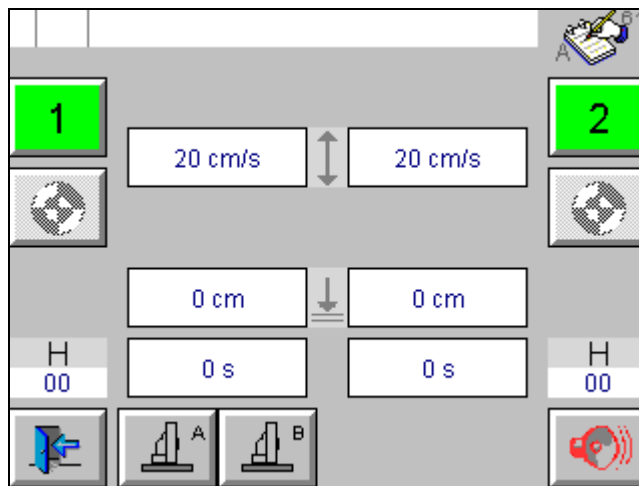
5. Press the large touch field in the middle
Following page is displayed:



Cleaning operation one level lower

Press the key 

The following page is displayed:



Cleaning positions of the axes

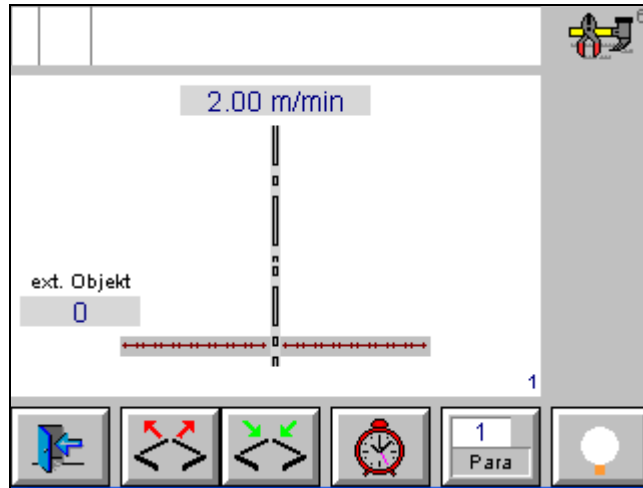
- Enter the cleaning positions and speed
- Enter the waiting time for the external cleaning

Service operation



Press the key

The following page is displayed:

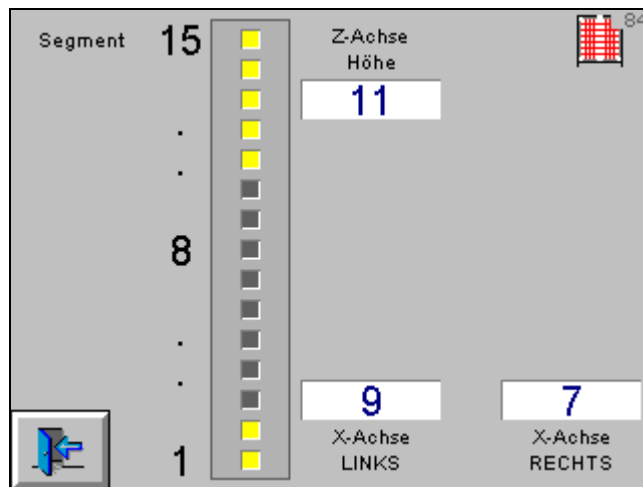


Main page service

Check the light grid

Press the key

The following page is displayed:



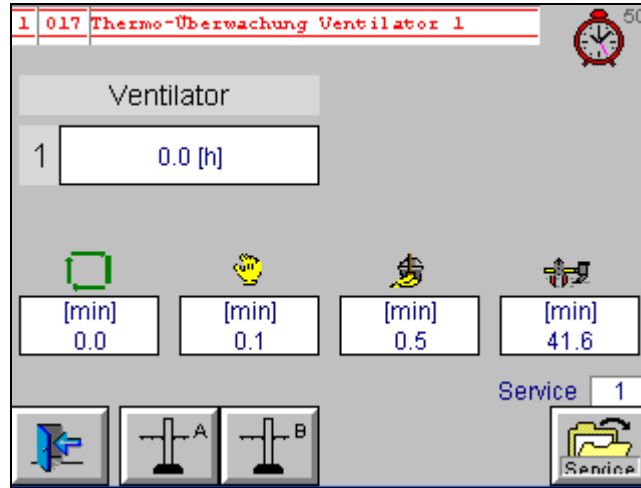
Light grid information

- 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:

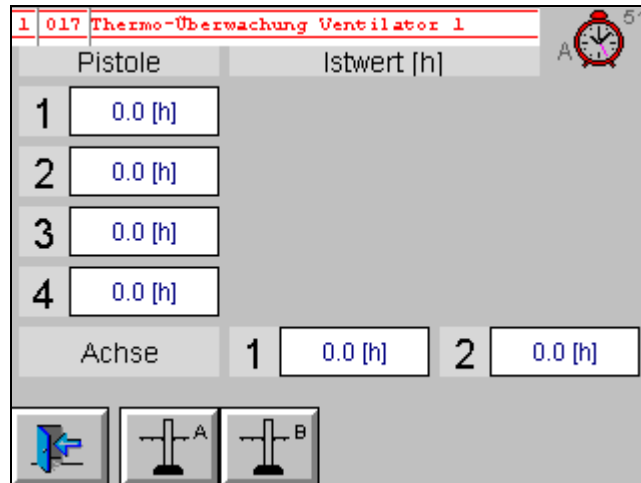


Main page operating hours

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



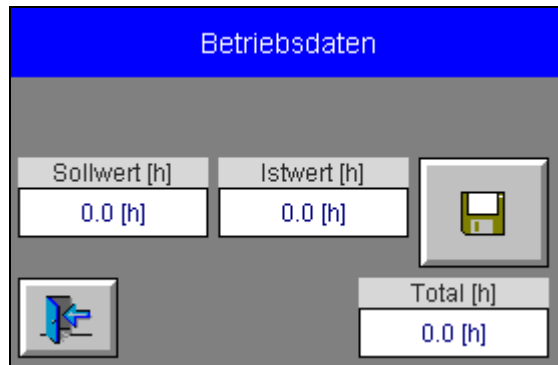
Press the key
The following page is displayed:



Operating hours

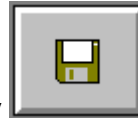
Press the key

The following page is displayed:



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

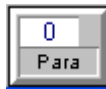


Lamp test



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	100
	2	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%	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, A, B, and Open Book.

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			

Achse 1 20 20 2 20 20

Navigation icons: Back, A, B, and Open Book.

Pretravel and overtravel of axes and guns

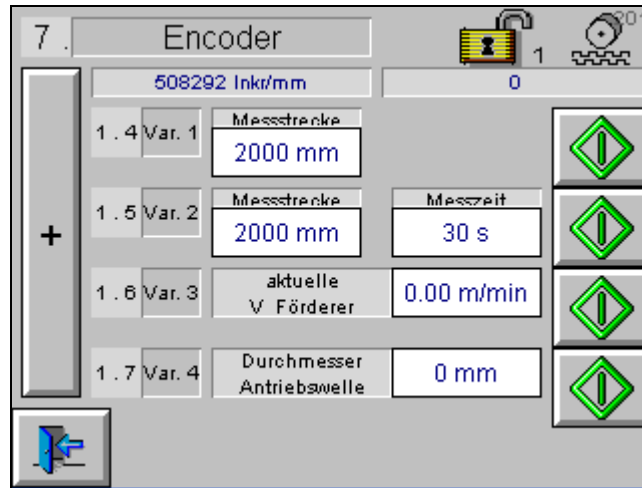
1. Adjust pretravel and overtravel for each axis
2. Adjust pretravel and overtravel of the guns

Calibration of the CAN bus sensor



Press the key

The following page is displayed:



Calibration of the CAN bus sensor

Four calibration options are available:

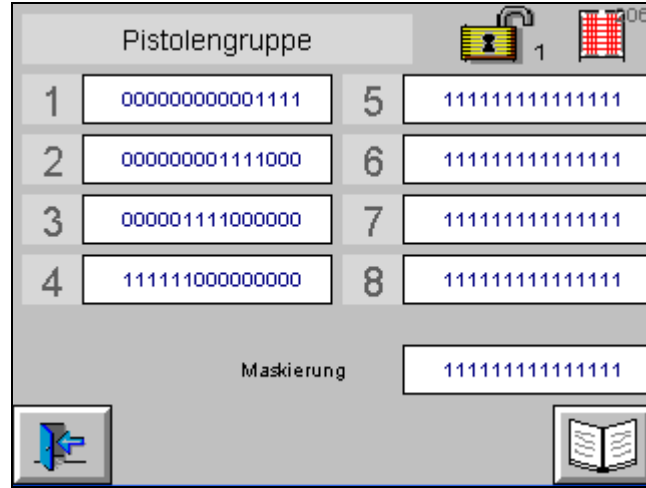
1. Calibrating a measuring section of 2 meters by start/stop key
 2. Calibrating a measuring section of 2 meters with the indication of the time needed for it by pressing the start key
 3. Calibrating by indicating the current conveying speed and by pressing the start key
 4. Calibrating by indicating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



Light grid evaluation for gun shutdown

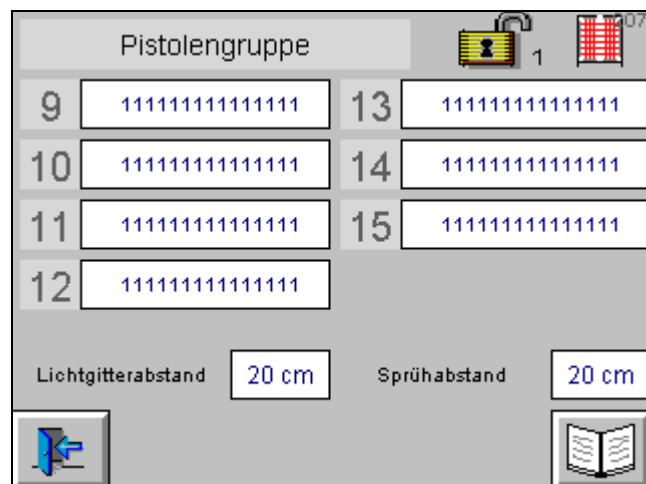
- Light grid distance is the distance between two light grid widths
- Spraying distance is the shortest spraying distance needed on the equipment

Light grid segmentation, light grid distance, minimum spraying distance



Press the key

The following page is displayed:




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
	Vorlauf	Nachlauf	
Aussen-Beschichtung	10 cm	10 cm	
Innen-Beschichtung	-10 cm	-10 cm	
Objekt	30 cm	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


Press the key 
 The following page is displayed:



Load 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

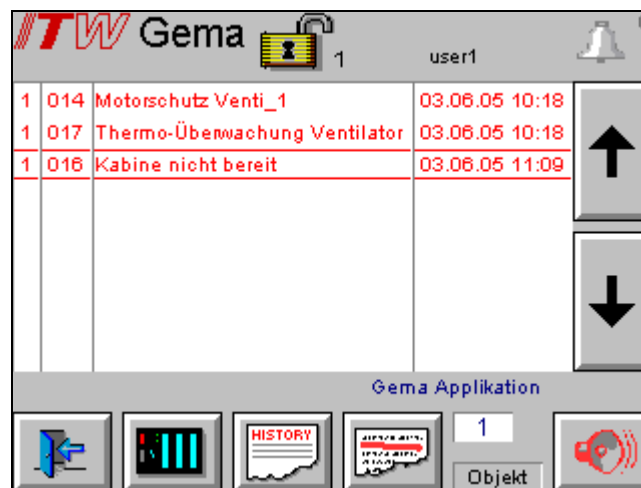
Error display

Main page error display

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

Press the key

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:

CANbus-Adresse

1 <input checked="" type="checkbox"/>	9 <input checked="" type="checkbox"/>	17 <input checked="" type="checkbox"/>	25 <input type="checkbox"/>	33 <input type="checkbox"/>	41 <input type="checkbox"/>	49 <input type="checkbox"/>	57 <input type="checkbox"/>
2 <input checked="" type="checkbox"/>	10 <input checked="" type="checkbox"/>	18 <input checked="" type="checkbox"/>	26 <input type="checkbox"/>	34 <input type="checkbox"/>	42 <input type="checkbox"/>	50 <input type="checkbox"/>	58 <input type="checkbox"/>
3 <input checked="" type="checkbox"/>	11 <input checked="" type="checkbox"/>	19 <input type="checkbox"/>	27 <input type="checkbox"/>	35 <input type="checkbox"/>	43 <input type="checkbox"/>	51 <input type="checkbox"/>	59 <input type="checkbox"/>
4 <input checked="" type="checkbox"/>	12 <input checked="" type="checkbox"/>	20 <input type="checkbox"/>	28 <input type="checkbox"/>	36 <input type="checkbox"/>	44 <input type="checkbox"/>	52 <input type="checkbox"/>	60 <input type="checkbox"/>
5 <input checked="" type="checkbox"/>	13 <input checked="" type="checkbox"/>	21 <input type="checkbox"/>	29 <input type="checkbox"/>	37 <input type="checkbox"/>	45 <input type="checkbox"/>	53 <input type="checkbox"/>	61 <input type="checkbox"/>
6 <input checked="" type="checkbox"/>	14 <input checked="" type="checkbox"/>	22 <input type="checkbox"/>	30 <input type="checkbox"/>	38 <input type="checkbox"/>	46 <input type="checkbox"/>	54 <input type="checkbox"/>	62 <input type="checkbox"/>
7 <input checked="" type="checkbox"/>	15 <input checked="" type="checkbox"/>	23 <input type="checkbox"/>	31 <input type="checkbox"/>	39 <input type="checkbox"/>	47 <input type="checkbox"/>	55 <input type="checkbox"/>	63 <input type="checkbox"/>
8 <input checked="" type="checkbox"/>	16 <input checked="" type="checkbox"/>	24 <input type="checkbox"/>	32 <input type="checkbox"/>	40 <input type="checkbox"/>	48 <input type="checkbox"/>	56 <input type="checkbox"/>	64 <input type="checkbox"/>

Active CAN bus devices - first page



Press the key
The following page is displayed:

CANbus-Adresse

65 <input checked="" type="checkbox"/>	73 <input type="checkbox"/>	81 <input type="checkbox"/>	89 <input type="checkbox"/>	97 <input type="checkbox"/>	105 <input type="checkbox"/>	113 <input type="checkbox"/>	121 <input type="checkbox"/>
66 <input checked="" type="checkbox"/>	74 <input type="checkbox"/>	82 <input type="checkbox"/>	90 <input type="checkbox"/>	98 <input type="checkbox"/>	106 <input type="checkbox"/>	114 <input type="checkbox"/>	122 <input type="checkbox"/>
67 <input checked="" type="checkbox"/>	75 <input type="checkbox"/>	83 <input type="checkbox"/>	91 <input type="checkbox"/>	99 <input type="checkbox"/>	107 <input type="checkbox"/>	115 <input type="checkbox"/>	123 <input type="checkbox"/>
68 <input checked="" type="checkbox"/>	76 <input type="checkbox"/>	84 <input checked="" type="checkbox"/>	92 <input type="checkbox"/>	100 <input type="checkbox"/>	108 <input type="checkbox"/>	116 <input type="checkbox"/>	124 <input type="checkbox"/>
69 <input type="checkbox"/>	77 <input type="checkbox"/>	85 <input checked="" type="checkbox"/>	93 <input type="checkbox"/>	101 <input type="checkbox"/>	109 <input type="checkbox"/>	117 <input type="checkbox"/>	125 <input type="checkbox"/>
70 <input type="checkbox"/>	78 <input type="checkbox"/>	86 <input type="checkbox"/>	94 <input type="checkbox"/>	102 <input type="checkbox"/>	110 <input type="checkbox"/>	118 <input type="checkbox"/>	126 <input type="checkbox"/>
71 <input type="checkbox"/>	79 <input type="checkbox"/>	87 <input type="checkbox"/>	95 <input type="checkbox"/>	103 <input type="checkbox"/>	111 <input type="checkbox"/>	119 <input type="checkbox"/>	127 <input type="checkbox"/>
72 <input type="checkbox"/>	80 <input type="checkbox"/>	88 <input type="checkbox"/>	96 <input checked="" type="checkbox"/>	104 <input type="checkbox"/>	112 <input type="checkbox"/>	120 <input type="checkbox"/>	128 <input type="checkbox"/>

Active CAN bus devices - second page

Fields colored in green show active CAN bus devices.

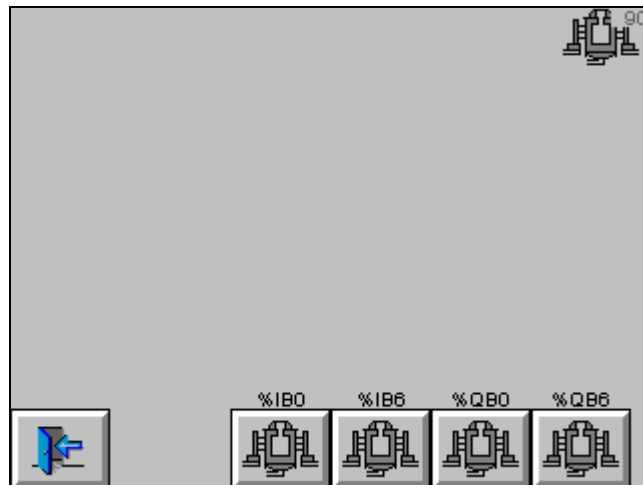
Device	Address	
	Decimal	Hexadecimal
OptiTronic CG02 gun control unit	1 - 64	1 - 3F
OptiMove CR04 reciprocator control unit	65 - 80	41 - 50
Powder center CPU	82	52
Booth knot	84	54
Light grid knot	85	55
Sensor	96	60
Powder center panel	97	61

Check digital inputs and set and delete outputs



Press the key

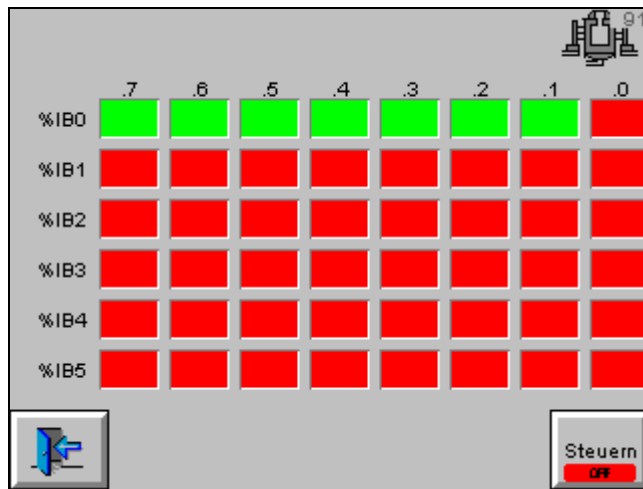
The following page is displayed:



Main page - digital inputs and outputs



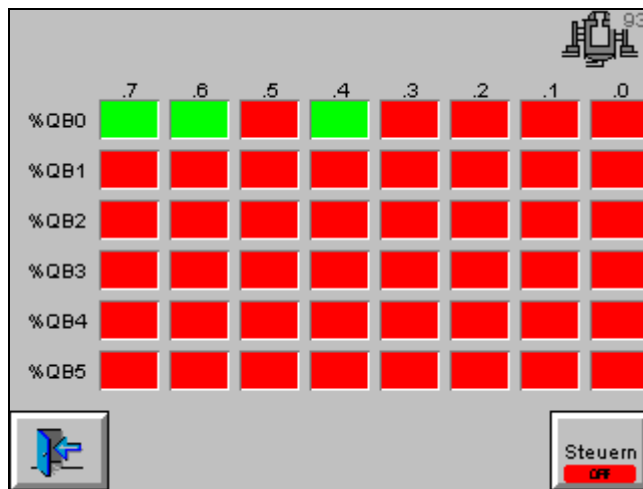
Press the key
The following page is displayed:



Input page



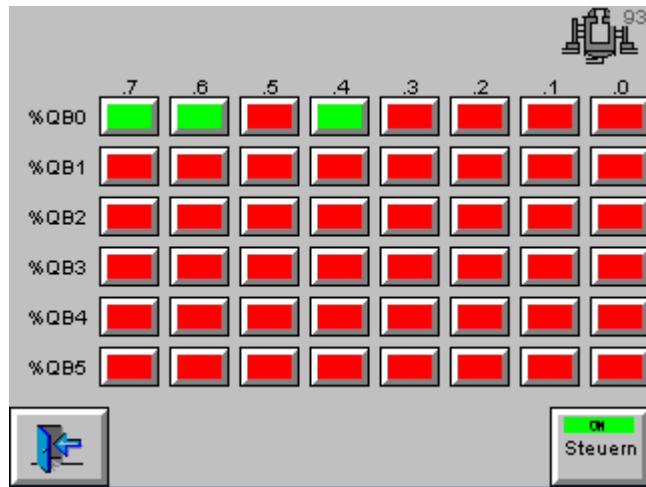
Press the key
The following page is displayed:




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

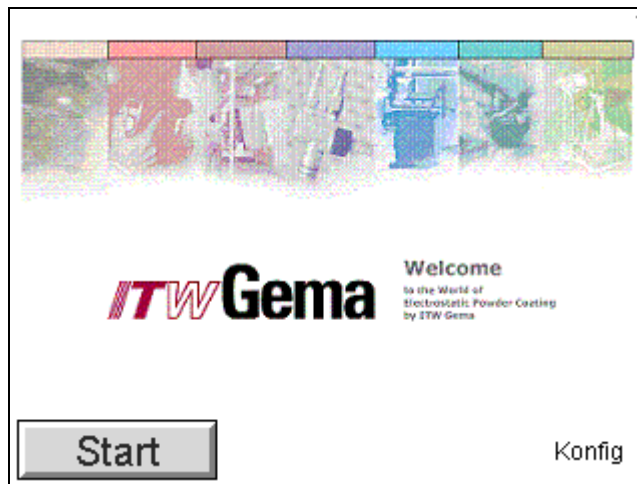
No user level



Logged out status

Plant configuration


General information

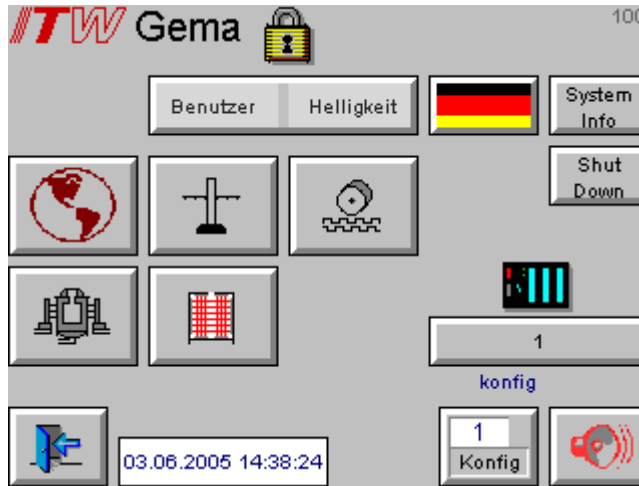


Start page

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 CM-20 plant control
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



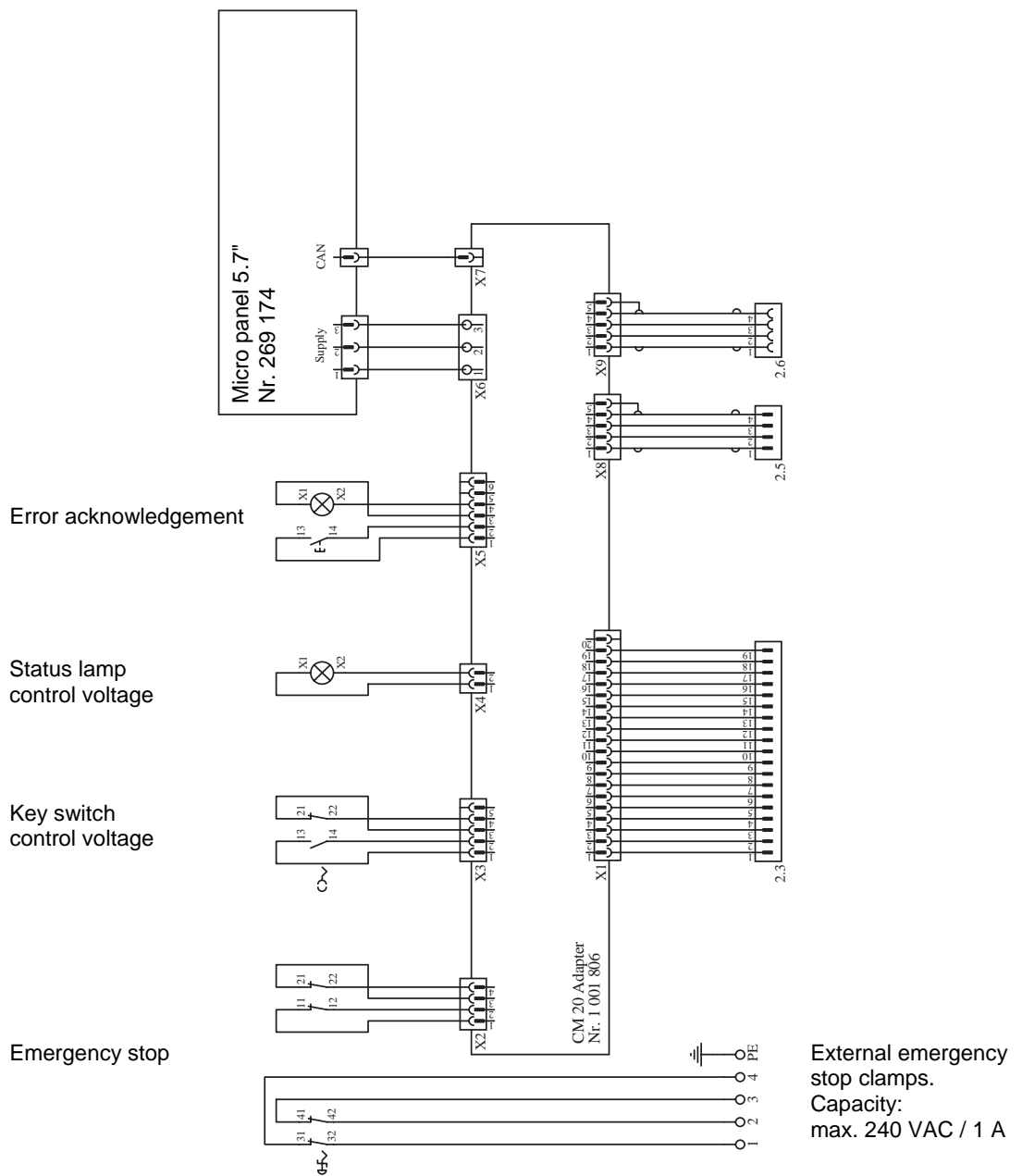
Booth definition



Set type of object recognition

Schematic diagrams

Wiring diagram



OptiControl CM-20 - 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 CM-20 plant control
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)



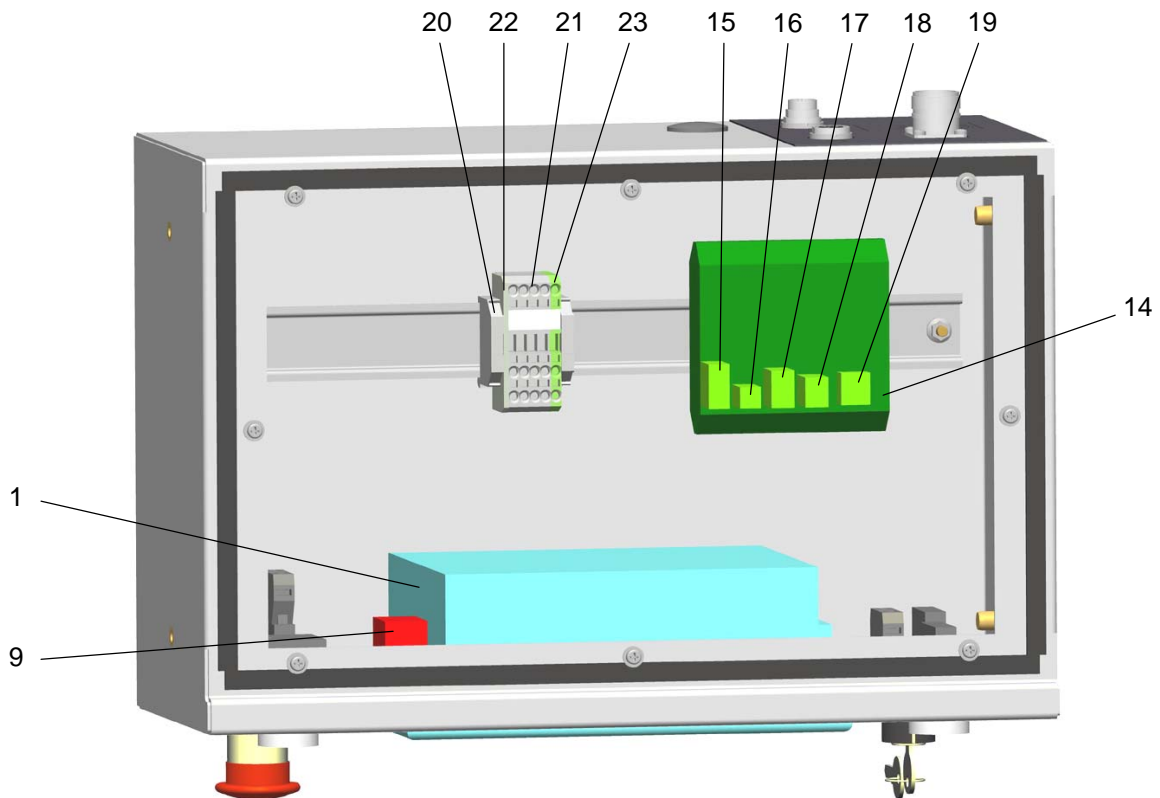
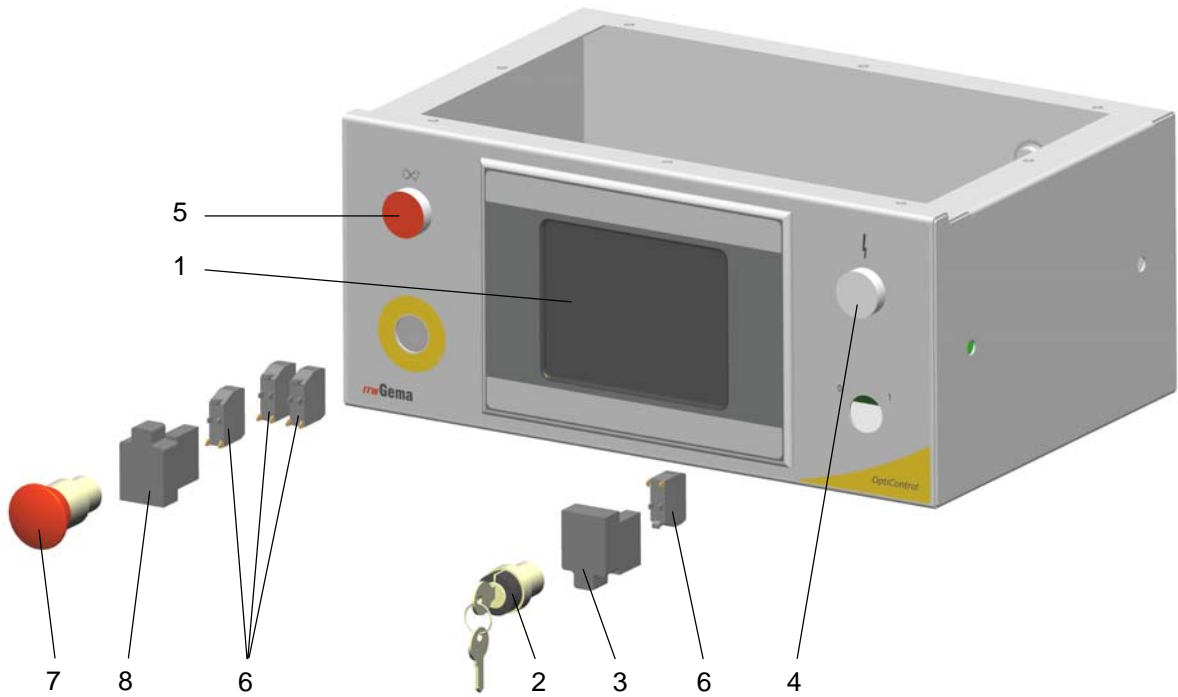
WARNING!

Only original ITW-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 ITW Gema guarantee conditions!

OptiControl CM-20 - spare parts list

	OptiControl CM-20 - complete	1002 350
1	Micro Touch Panel - MC2-5,7", complete	269 174
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 CM20	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 ² , P	241 636
22	Triple conductor terminal end plate - 2,5 mm	241 660
23	Triple conductor terminal - 2,5 mm ² , PE	241 652

OptiControl CM-20 - spare parts



OptiControl CM-20 - spare parts

OptiControl CM-20 - spare parts (rear side)



OptiControl CM-20 - spare parts (rear side)

