CG09-P
Manual gun control unit
Documentation CG09-P

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# Table of contents

**General safety regulations**
- Safety symbols (pictograms) ................................................................. 3
- Conformity of use ................................................................................. 3
- Product-specific safety measures ......................................................... 4
  CG09-P Manual gun control unit ......................................................... 4

**About this manual**
- General information ........................................................................... 5
- Software version .................................................................................. 5

**Product description**
- Field of application ............................................................................. 7
- Technical data ...................................................................................... 8
  - Connectable guns ........................................................................... 8
  - Electrical data ................................................................................ 8
  - Pneumatic data ............................................................................... 9
  - Powder output (guide values) ......................................................... 9
  - Air flow rates ................................................................................ 10
- Compatibility and interactions .............................................................. 10
- Design and function ........................................................................... 11
  - General view .................................................................................. 11
  - Operating elements ........................................................................ 12
  - Input keys and switches .................................................................. 14
  - Connections .................................................................................... 15
  - Pin assignment ................................................................................ 15
- Scope of delivery .................................................................................. 16
- Typical properties - Characteristics of the functions .......................... 16
  - Operating modes ............................................................................ 16
  - Rinsing mode ................................................................................. 18
  - Remote control by gun ................................................................... 18
  - Monitoring of wearing parts ......................................................... 19
  - Keyboard lock ................................................................................. 20
  - Background illumination ............................................................... 20
  - Correction factor for the powder output ...................................... 20

**Start-up**
- Preparation for start-up ..................................................................... 21
- Basic conditions .................................................................................. 21
- Mounting instructions ....................................................................... 21
- Connection instructions ................................................................... 22

**Initial start-up**
- Setting the device type ..................................................................... 25
- Operation ............................................................................................ 27
  - Select predefined operating mode (Preset mode) ....................... 27
  - Starting the user-defined operating mode (Program mode) ......... 27
# Table of contents

- Setting powder output and powder cloud .......................................................... 28
- Technical explanations about automatic transport air/spraying air setting ............. 29
- Setting the electrode rinsing air ........................................................................ 30
- Setting the fluidization .................................................................................... 30
- Cleaning mode .................................................................................................. 31
- Activating the cleaning function ...................................................................... 31
- Cleaning programs ........................................................................................... 31
- Setting correction factor for powder output .................................................... 32
- Entering the correction factor .......................................................................... 32
- Powder output/powder hose correction ......................................................... 33
- Carrying out a powder output correction ....................................................... 33
- Procedure (powder output correction) ............................................................. 34
- Procedure (powder hose correction) ............................................................... 34
- Monitoring of wearing parts and trigger counter ............................................. 35
- View remaining service life ............................................................................ 37
- Deactivation of wearing part monitoring ........................................................ 37
- Setting the background illumination .............................................................. 38
- Activate/deactivate the program change via remote control ................................ 38
- Activate/deactivate the keyboard lock ............................................................ 38
- Shutdown .......................................................................................................... 39
- If in disuse for several days ............................................................................. 39

## Troubleshooting

- Error diagnosis of the software ......................................................................... 41
- General information ......................................................................................... 41
- Help codes ........................................................................................................ 41
- Help codes list ................................................................................................ 43
- Appearance of errors ...................................................................................... 43

## Spare parts list

- Ordering spare parts ........................................................................................ 45
- CG09-P Manual gun control unit ...................................................................... 46
- CG09-P – Front plate ....................................................................................... 47
- CG09-P – Front plate ....................................................................................... 48
- CG09-P – Rear wall ........................................................................................ 49
- CG09-P – Rear wall ........................................................................................ 50
- CG09-P – Power pack .................................................................................... 51
- CG09-P – Power pack .................................................................................... 52
- CG09-P – Connections ................................................................................... 53
- CG09-P – Connections ................................................................................... 54
- Diffuser ............................................................................................................ 55
General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and any third parties using the CG09-P.

These safety regulations must be read and understood in full before the CG09-P is put into operation.

Safety symbols (pictograms)

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

DANGER!
Danger due to electrically live 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 CG09-P 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 CG09-P 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 CG09-P 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 intended operational tasks) is forbidden until it has been established that the CG09-P 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 CG09-P 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.

Product-specific safety measures

- Installation work performed by the customer must be carried out according to local regulations.
- All components must be grounded according to the local regulations before start-up.

CG09-P Manual gun control unit

The CG09-P manual gun control unit is a component 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 security information, see the more detailed Gema safety regulations!
About this manual

General information

This operating manual contains all the important information required for the working with the CG09-P manual gun 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 functional mode of the individual system components - booth, gun and powder injector - should be referenced in the respective enclosed documents.

Software version

This document describes the operation of the CG09-P manual gun control unit, with software version starting from 1.0!
Product description

Field of application

The CG09-P manual gun control unit is designed exclusively for controlling the Gema powder coating guns (Please also see chapter "Technical data").

Any other use is considered non-compliant. The manufacturer is not responsible for any incorrect use and the risks associated with such actions are assumed by the user alone!

For a better understanding of the interrelationships in powder coating, it is recommended that the operating instructions for all other components be read as well, so as to be familiar with their functions too!

Reasonably foreseeable misuse

- Operation without the proper training
- Use with insufficient compressed air quality and grounding
- Use in connection with unauthorized coating devices or components
Technical data

Connectable guns

<table>
<thead>
<tr>
<th>CG09-P</th>
<th>connectable</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM03</td>
<td>yes, with diffuser</td>
</tr>
</tbody>
</table>

Warning:
The CG09-P manual gun control unit may only be used with the specified gun types!

Electrical data

<table>
<thead>
<tr>
<th>CG09-P</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal input voltage</td>
<td>100-240 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50-60 Hz</td>
</tr>
<tr>
<td>Connected load (without vibrator)</td>
<td>40 VA</td>
</tr>
<tr>
<td>Nominal output voltage (to the gun)</td>
<td>eff. 10 V</td>
</tr>
<tr>
<td>Nominal output current (to the gun)</td>
<td>max. 1.2 A</td>
</tr>
<tr>
<td>Connection and output for vibrator (on Aux output)</td>
<td>110/230 VAC max. 100 W</td>
</tr>
<tr>
<td>Connection for rinsing function (valve)</td>
<td>24 VDC max. 3 W</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP54</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 °C - +40 °C (+32 °F - +104 °F)</td>
</tr>
<tr>
<td>Max. surface temperature</td>
<td>85 °C (+185 °F)</td>
</tr>
</tbody>
</table>

Approvals

CE 0102 II 3 (2) D
PTB11 ATEX 5007
Pneumatic data

<table>
<thead>
<tr>
<th>CG09-P</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air connection (on control unit)</td>
<td>8 mm</td>
</tr>
<tr>
<td>Input pressure (control of unit during operation)</td>
<td>6 bar / 87 psi</td>
</tr>
<tr>
<td>Max. water vapor content of the compressed air</td>
<td>1.3 g/m³</td>
</tr>
<tr>
<td>Max. oil vapor content of the compressed air</td>
<td>0.1 mg/m³</td>
</tr>
</tbody>
</table>

Powder output (guide values)

**General conditions for DPP01 Dense phase pump**

<table>
<thead>
<tr>
<th>Powder type</th>
<th>Epoxy/polyester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder hose length (m)</td>
<td>14</td>
</tr>
<tr>
<td>Powder hose Ø (mm)</td>
<td>10</td>
</tr>
<tr>
<td>Power hose type</td>
<td>POE with guide strips</td>
</tr>
<tr>
<td>Input pressure (bar)</td>
<td>5.5</td>
</tr>
<tr>
<td>Transport air nozzle Ø (mm)</td>
<td>1.6</td>
</tr>
<tr>
<td>Correction value C0</td>
<td>Powder output zeroing adjustment</td>
</tr>
</tbody>
</table>
Air flow rates

The total air consists of transport air and supplementary air, in relation to the selected powder quantity (in %). As a result the total air volume is maintained constant.

<table>
<thead>
<tr>
<th>CG09-P</th>
<th>Range</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate - fluidizing air</td>
<td>0-5.0 Nm³/h</td>
<td>1.0 Nm³/h</td>
</tr>
<tr>
<td>(without AirMover air requirements)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrode rinsing air flow rate</td>
<td>0-5.0 Nm³/h</td>
<td>0.1 Nm³/h</td>
</tr>
<tr>
<td>Flow rate total air (at 6 bar)</td>
<td>1.8-6.5 Nm³/h</td>
<td></td>
</tr>
</tbody>
</table>

Note:
The total air consumption for the device is determined based on the 3 configured air values (without AirMover air value). These values apply for an internal control pressure of 6 bar!

Compatibility and interactions

The CG09-P manual gun control unit is used for the following manual equipment from the OptiFlex line:

- OptiFlex F (with fluidized powder hopper)
Design and function

General view

1 Front plate with control and display elements
2 Enclosure
3 Back panel with interfaces
Operating elements

Display and input buttons

Note:
For easier operation of the control unit, the preset and actual values are distributed across several levels. The "sel" key is used to switch between the levels. If no controls are used within 6 s, the device automatically returns to level 1.

Displays, Level 1

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1-A4</td>
<td>Display of actual values, preset values and system parameters</td>
</tr>
<tr>
<td>A5</td>
<td>Display of program numbers, error diagnosis codes and status information</td>
</tr>
<tr>
<td>S1</td>
<td>Powder output (display in %)</td>
</tr>
<tr>
<td>S4</td>
<td>Total air volume (display in Nm³/h)</td>
</tr>
<tr>
<td>S7</td>
<td>High voltage (display in kV)</td>
</tr>
<tr>
<td>S9</td>
<td>Spraying current (display in µA)</td>
</tr>
</tbody>
</table>
### Displays and LEDs, Level 2

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3</td>
<td>Electrode rinsing air (display in Nm³/h)</td>
</tr>
<tr>
<td>S6</td>
<td>Fluidizing (display in Nm³/h)</td>
</tr>
<tr>
<td>S13</td>
<td>Activation of fluidization</td>
</tr>
<tr>
<td>S19</td>
<td>Display illumination (0-8)</td>
</tr>
</tbody>
</table>
## Input keys and switches

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1-T8</td>
<td>Input keys for preset values and system parameters</td>
</tr>
<tr>
<td>T9 (Select)</td>
<td>Switch between display levels</td>
</tr>
<tr>
<td>T10-T11</td>
<td>Program change</td>
</tr>
</tbody>
</table>
| T12         | Switching on and off the fluidization  
|             | Switchover to system parameter mode (Press for at least 5 secs.) |
| T13         | Preset mode for flat parts (fixed values) |
| T14         | Preset mode for complex parts with depressions (fixed values) |
| T15         | Preset mode for overcoating parts already coated (fixed values) |
| T16/T17     | Power switch On/Off |
Connections

Compressed air hoses / cables

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Main air IN</td>
<td>Connection compressed air (6 bar / 87 PSI)</td>
</tr>
<tr>
<td>2.1 Power IN</td>
<td>Mains cable connection (100-240 VAC)</td>
</tr>
<tr>
<td>2.3 Gun</td>
<td>Gun cable connection</td>
</tr>
<tr>
<td>2.5 Ext.</td>
<td>DPP01 Dense phase pump connection</td>
</tr>
<tr>
<td>1.2</td>
<td>Transport air connection</td>
</tr>
<tr>
<td>1.3</td>
<td>Spraying air connection</td>
</tr>
<tr>
<td>1.4</td>
<td>Electrode rinsing air connection</td>
</tr>
<tr>
<td>1.5</td>
<td>Fluidizing air connection</td>
</tr>
<tr>
<td></td>
<td>Grounding connection</td>
</tr>
</tbody>
</table>

Pin assignment

Power IN connection

- 1 Neutral conductor (power supply)
- 2 Phase (100-240 VAC)
- 3 empty
- PE Grounding PE
**Gun connection**

1. Ground
2. Remote control
3. Ground
4. Trigger
5. Remote control
6. Oscillator

PE Grounding PE

**Dense phase pump connection**

A-J Control signal valve 1-9
K IDENT / Recognition
L REQUEST / Request
M GND / Ground
Enclosure Shield

---

**Scope of delivery**

- Power cable (country-specific)
- Quick start instructions and operating manual

---

**Typical properties - Characteristics of the functions**

**Operating modes**

The CG09-P manual gun control unit has two operating modes.

**Predefined operating mode (Preset mode)**

The CG09-P manual gun control unit has three preset application modes:

- **Application mode for flat parts**
  
  This application mode is suitable for the coating of simple, flat workpieces without larger cavities.

- **Application mode for complex parts**
  
  This application mode is suitable for the coating of three-dimensional workpieces with complex shapes (e.g. profiles).

- **Application mode for recoating parts already coated**
This application mode is suitable for the overcoating of workpieces which are already coated.

In this operating modes, current (µA) and high voltage (kV) are preset, while powder and air volumes can be set and stored for each application mode.

**Adjustable operating mode (Program mode)**

In this operating mode, 20 individually definable programs (P01-P20) are available. These programs are automatically saved and can be recalled again as the application requires.

The values for current, high voltage, powder output, total air, electrode rinsing air and fluidizing air (if available) can be set as needed for a given application.

**Note:**
The settings defined in the 20 programs and 3 application modes are automatically stored, without confirmation!

**Precise Control of spraying Current (PCC Mode)**

For coating components with both complex and simple geometries, a spraying current of below 10 µA can be selected to prevent unintended overcoating on the simpler surfaces. This is especially important in combination with high loading powders (such as metallic). The controller automatically switches into "PCC mode". This allows for very fast yet highly precise control. The high voltage and spray current values and their symbols are depicted in red:
**Rinsing mode**

The Rinsing mode is used to blow powder accumulations and moisture out of the powder hose, dense phase pump, and gun using compressed air.

**Note:**
The rinsing mode can only be activated from standby mode, namely by pressing the corresponding button on the gun remote control.

The rinsing mode is signalized by a circling LCD segment on the display:

The actual rinsing procedure is started and stopped by pressing the gun trigger.

Once the rinsing mode is quit, the unit automatically returns to the last program.

**Remote control by gun**

Various functions can be remotely controlled using the buttons on the rear side of the powder gun (GM03 gun type):

- Modify the powder output (press the \(\Delta\) or \(\nabla\) key on the gun) The powder output will be increased or decreased accordingly
  
- Change programs (press the \(\Delta\) or \(\nabla\) key on the gun) It is switching between programs P01-P20. This function must be activated first, in order to use it - see "Activate/deactivate the program change via remote control".

**Note:**
Pressing one of the keys calls up the preset values instead of the actual values!

- Switch to PowerClean mode (Press \(P\) button).

**Note:**
The remote control is blocked as long as the keyboard lock is activated or while in system parameterization mode.
Monitoring of wearing parts

Wearing parts have a limited service life. The CG09-P gun controller offers functionality to monitor the service life of up to four wearing parts using a reverse counter:

Note:
The order of wearing parts to be monitored as well as the service life can be set as needed by the operator.

Example table:

<table>
<thead>
<tr>
<th>No.</th>
<th>Wearing part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insert sleeve</td>
</tr>
<tr>
<td>2</td>
<td>Powder hose</td>
</tr>
<tr>
<td>3</td>
<td>Electrode holder</td>
</tr>
<tr>
<td>4</td>
<td>Pulverizing element</td>
</tr>
</tbody>
</table>

To better explain this function, a few terms relevant to this process must first be explained:

<table>
<thead>
<tr>
<th>Service life</th>
<th>Operating time after which wearing parts should be replaced (defined by the operator).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minus hours</td>
<td>Number of hours past the selected service life that the wearing part has continued to be used.</td>
</tr>
<tr>
<td>Operating life</td>
<td>Effective time during which the wearing part was in operation = service life plus minus hours, if any</td>
</tr>
<tr>
<td>Remaining service life</td>
<td>displayed value (where not in the minus range)</td>
</tr>
</tbody>
</table>

- The service life monitoring can be activated/deactivated for each wearing part (see also "Initial start-up - Monitoring of wearing parts")
- By default all monitoring is deactivated and must be activated by the operator
- Query the remaining service life
- Reset the operating time
- Unit used for display of service life / operating time: 1 h
Keyboard lock

The CG09-P manual gun control unit has a keyboard lock to prevent modification of individual parameter values (kV, µA etc.) within the operating modes (Program and Preset). Following is not affected by the keyboard lock:

- Program selection
- Display of preset values of the current program
- Displaying the actual values
- Error acknowledgement

An active keyboard lock is indicated by a blinking of the remote display. (see also "Initial start-up - Activate/deactivate the keyboard lock")

The keyboard lock status remains stored, when switching the equipment off and on.

Background illumination

**Brightness**

8 different brightness settings are available for the display. The setting remains in place when the machine is switched on/off.

*Auto Power Save mode*

If no powder is being applied, then the background lighting turns off automatically 5 minutes after a button has been pressed last time.

**Correction factor for the powder output**

The CG09-P manual gun control unit enables a zeroing out of the powder output. This allows for compensation to different powder hose lengths connecting to the pistol.

The correction factor C0 can be selected such that no powder is output when the powder share is reduced to 0%. (see also "Initial start-up - Setting correction factor for powder output")
Start-up

Preparation for start-up

Basic conditions
When starting up the CG09-P manual gun control unit, the following general conditions impacting the coating results must be taken into consideration:
- Gun control unit correctly connected
- Gun correctly connected
- Corresponding power and compressed air supply available
- Powder preparation and powder quality

Mounting instructions
The CG09-P manual gun controller is mounted into place using 2xM6 screws on the front side.
Note:
Use clamp to connect grounding cable to the cabin or the suspension arrangement. Check ground connections with Ohm meter and ensure 1 MOhm or less!
Note:
The compressed air must be free of oil and water!
Initial start-up

Note:
The manual gun control unit always starts up to the last configured settings.

Setting the device type

Note:
If the control unit is supplied as a component of an OptiFlex 2 complete unit, then the corresponding system parameter is set correctly by the factory!

1. Turn on the gun control unit with the ON key

2. Hold key down for 5 seconds
   The display switches to the following level:

3. Adjust the corresponding system parameter value (device type) with the < or > keys.
   The value of the adjusted system parameter appears on corresponding display A3

Note:
The system parameter P0 of the manual unit may not be set to 3 (automatic device)!
A wrong parameterization leads to various malfunctions!

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Values</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>Device type</td>
<td>0 - Fluidizing device (type F)</td>
<td>F</td>
</tr>
</tbody>
</table>
4. Press the key to quit the system parameter mode. The display switches to the standard level.
Operation

Note:
During the initial commissioning of the device, it is recommended that the functional check be performed without powder!

Select predefined operating mode (Preset mode)

1. Turn on the gun control unit with the ON key
2. Press the corresponding application key the arrow above the pressed key is switched on

![Application Modes](image)

The pre-defined application modes have preset values for high voltage and spray current:

<table>
<thead>
<tr>
<th>Application mode</th>
<th>Preset µA</th>
<th>Preset kV</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Flat Parts" /></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><img src="image" alt="Complex Parts" /></td>
<td>22</td>
<td>100</td>
</tr>
<tr>
<td><img src="image" alt="Overcoated" /></td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

3. The air values for total air, powder output, electrode rinsing air and fluidizing air can be individually defined and are saved in the programs.

Starting the user-defined operating mode (Program mode)

1. Turn on the gun control unit with the ON key
2. Press ![Program Key](image) program key
3. Select desired program (01-20)

![Program 20 Active](image)

Program 20 active

4. Change coating parameters as required

Note:
These programs can be modified and are then automatically saved.
Setting powder output and powder cloud

The powder output depends on the selected powder output (in %) and the selected total air volume.

Setting the total air volume

1. Adjust the total air volume with the T3/T4 keys (see also the manual gun / dense phase pump operating manual)
   - Adjust the total air volume according to the corresponding coating requests

Setting the powder output

1. Adjust the powder output volume (e.g. according to the desired coating thickness)
   - Factory default setting of 50% is recommended for initial operation. The total air volume is thereby kept constant automatically by the control unit.

Note:
As a factory default value, a powder rate of 50% and a total air volume of 4 Nm³/h are recommended.
By inserting values, which the equipment cannot execute, the operator is made aware by flashing of the appropriate display and a temporary out of range message!

2. Check fluidization of the powder in the powder container
3. Point the gun into the booth, press the gun trigger and visually check the powder output
Technical explanations about automatic transport air/spraying air setting

**Transport air**

The transport air will be used for conveying the powder from the dense phase pump to the powder gun. The transport air quantity will be set automatically by the device, based on the adjusted powder quantity and an adjustable correction factor (Transport air offset C3).

The transport air calculation depends furthermore on the correction factors C1 and C2, which are also considered.

**Transport air (TL) calculation**

![Characteristic curve of the transport air](image)

**Setting the spraying air**

The spraying air (ZL) will be defined in accordance to the calculated transport air (TL) and the adjusted total air volume (GL).

Formula:

\[ GL = ZL + TL \]
Setting the electrode rinsing air

1. Press the key **T9 (SELECT)**
   The second display level will be shown

2. Adjust the correct electrode rinsing air according to the applied nozzles (deflector plate, flat jet nozzle)

**Note:**
By using flat jet nozzles, the factory default value is approx. 0.3 Nm³/h, by using round jet nozzles with air-rinsed deflector plates, the factory default value is approx. 0.5 Nm³/h!

3. If in this display level is no operation for 3 seconds, the first display level is switched over independently

Setting the fluidization

The powder fluidization depends on the powder type, the air humidity and the ambient temperature. Fluidizing and vibration start by switching on the control unit.

**Procedure:**

1. Configure AirMover by opening the ball valve complete and adjusting with the flow control valve (OptiFlex 2 F only)
2. Open the powder container cover
3. Press the key **T9 (SELECT)**
   The second display level will be shown
4. Adjust the fluidizing air with the keys **T5/T6**
   - If in this display level is no operation for 3 seconds, the device switches back to the first display level
   - The powder should only be touched gently, but should be "cooked" regularly and is also to be stirred using a rod
5. Close again the cover
Cleaning mode

The cleaning mode enables the cleaning of the dense phase pump and the powder hose. Three different rinsing programs are available to prepare the dense phase pump for a color change.

Activating the cleaning function

1. The LCD segments begin to move on the CG09 display

2. Press the corresponding application key
   The blue arrow above the pressed key is switched on

3. = START

NOTE!
The rinsing function can be stopped as required using the P key.

Cleaning programs

**Powder chamber emptying**

In this cleaning program (key T13), some air is blown through the filter elements in the powder chambers. The cleaning process can be additionally supported by blowing compressed air into the suction hose.

Note:
The dense phase pump may be cleaned with a pressure of max. 4 bar!

**Cleaning the hose to the gun**

In this cleaning program (key T14), the powder hose to the gun will be cleaned with 8 long and 18 short air blasts for each powder chamber. During this time, the pinch valves on the suction side remain closed.


Cleaning the hose on the suction side

Warning:
Large dust formation possible!
The powder hose and the powder gun must be pointed into the booth during the cleaning procedure!

In this cleaning program (key T15), the powder hose on the inlet of the dense phase pump will be cleaned with 8 long and 18 short air blasts for each powder chamber. During this time, the pinch valves on the output to the gun remain closed.

The cleaning mode is terminated by pressing the P key again.

Setting correction factor for powder output

Entering the correction factor

1. Hold  key down for 5 seconds
   The display switches to the following level:

2. Press  key
   The display switches to the following level:

3. The value of the correction factor C0 is displayed
4. Set corresponding correction factor using the T7/T8 keys (Selection range 0.5-3.0). The default value for the manual unit is 1.0 (6 m powder hose).

5. Press 

Display returns to the first level display.

---

**Powder output/powder hose correction**

The CG09-P Gun control unit can be adapted with the correction values optimally to local conditions (e.g. the adjustment of different powder outputs in the plant).

**Carrying out a powder output correction**

Powder output corrections are made at the first start-up, after a service work, after the solution of application problems, or by using different hose diameters!

It is recommended to create a table with input fields (see "Example table for powder output/powder hose correction"), so that, if a possible system reset takes place, an access to these data can take place.
The guide values can be extracted from the following table:

<table>
<thead>
<tr>
<th>Corr.-value</th>
<th>Description</th>
<th>Range</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C0</td>
<td>Powder offset (ms)</td>
<td>0-50</td>
<td>20</td>
</tr>
<tr>
<td>C1</td>
<td>Powder hose correction value (%)</td>
<td>40-100</td>
<td>100</td>
</tr>
<tr>
<td>C2</td>
<td>Daily correction value (%)</td>
<td>50-150</td>
<td>100</td>
</tr>
<tr>
<td>C3</td>
<td>Transport air offset (Nm³/h)</td>
<td>0-2.0</td>
<td>0.5</td>
</tr>
</tbody>
</table>

**Procedure (powder output correction)**

1. Set the total air to 4.0 (Nm³/h) on the A2 display. Set the powder output to 00 (%) on the A1 display.
2. To enter the system parameter mode, press the key T16 longer than 5 seconds. The correction factor number is shown in the display A2 with a C placed in front.
3. Set the correction value for minimum powder output C0 to 20 (ms) on the A4 display with the keys T7/T8.
4. Set the correction value for maximum powder output C1 to 100 (%) on the A4 display.

For the next steps a measuring bag is necessary, for weighing the powder output. Do not forget to note the dead weight of the measuring bag.

5. Put the measuring bag over the gun nozzle and fasten it. Switch on the gun for 60 seconds.
6. After this time has elapsed, switch off the gun, remove the measuring bag and weigh it. The powder output should be between 10-15 g.
7. If no powder is expelled from the gun, return to the system parameter mode and increase the minimum powder output value C0 (range 0-50 ms).
8. Repeat steps 5 and 6, until the powder output amounts to 10-15 g. Annotate the adjusted minimum powder output value C0 in the table.

Exit the system parameter mode by pressing the key T16.

**Procedure (powder hose correction)**

1. Set the powder output value to 80 (%) on the A1 display.
2. Put the measuring bag over the gun nozzle and fasten it. Switch on the gun for 60 seconds.
3. Switch off the gun after 60 seconds, remove the measuring bag and weigh it.
4. Annotate the powder output in g/min in the table.
Calculate the powder output correction according to the formula:

\[
C_1 (%) = \frac{\text{smallest powder output}}{\text{measured powder output}} \times 100
\]

5. Annotate the calculated value (C1) in the table and enter the value to the control unit (therefore, repeat the steps 2 and 3)

Note:
The daily correction value (C2) can be used to allow high powder volumes!

Note:
The hose length correction factor is chosen in such a way, that no powder is visible, if the powder portion is 0%, by increasing the value, the powder becomes visible then. This performance depends on the hose length and the hose diameter!

Note:
The transport air offset (C3) can be used to correct the powder output if it is spitting or inconsistent!

Monitoring of wearing parts and trigger counter

1. Press key 2x
   The display switches to the following level:

   ![Display Image]

2. Press \( \text{and } \) at same time
   Monitoring is activated
   During the first activation a value of 1 is shown as the start value. If monitoring has already been activated at some earlier point, then the last stored value is displayed.

3. Set the desired service life for each wearing part using the \( \text{or } \)
4. The reverse counter is then activated and runs only during active coating.

5. If the selected service life is exceeded, the service symbol appears on the display. The coating procedure is not affected by this.

The status information (trigger counter) can be indicated on display A5 by pressing a combination of two different keys as shown. First press and hold key T12, then press either key T10 or T11.

<table>
<thead>
<tr>
<th>Status information</th>
<th>Key combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger &quot;ten hours&quot; counter (total time in 10 hours of trigger time). The trigger counter can't be reset!</td>
<td>T12 with T10</td>
</tr>
</tbody>
</table>

The status display is shown as long as a key is held.
View remaining service life

1. Press key 2x
   The display switches to the wearing part monitoring level

Display example

<table>
<thead>
<tr>
<th>Service life expired negative value: display blinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring deactivated</td>
</tr>
</tbody>
</table>

Display of remaining service life

< or > adjustment of service life

< and > Deactivation of monitoring

< and > Activation of monitoring

Quit wearing parts monitoring

Read minus hours  -75 h
Selected service life  100 h
Operating life  175 h

Deactivation of wearing part monitoring

1. Press < and > key simultaneously
   Monitoring is deactivated.
Setting the background illumination

1. Press \[\text{sel}\] key
   The display switches to the following level:

2. Select the desired brightness

Activate/deactivate the program change via remote control

The remote control function has been set in the factory to change the powder output. If the operator prefers the possibility to switch between the programs P01-P20, this function is to be activated/deactivated on the control unit as follows:

1. Hold \[\text{off}\] key pressed
2. Press \[\text{sel}\] key
   The program change function is activated/deactivated

Activate/deactivate the keyboard lock

1. Hold \[\text{off}\] key pressed

2. Press \[\text{sel}\] key
   The keyboard lock is activated. The remote display blinks.
3. The keyboard lock is cancelled by pressing the same key combination
Shutdown

1. Release gun trigger
2. Switch off the control unit
3. Switch off AirMover

Note:
The adjustments for high voltage, powder output, electrode rinsing, air and fluidizing remain stored!

If in disuse for several days

1. Separate from power mains
2. Clean the coating equipment (see the corresponding operating manual)
3. Turn off the compressed air main supply
Troubleshooting

Error diagnosis of the software

General information
The correct function of the CG09-P Gun control unit is constantly monitored. If the equipment software determines a fault, an error message is indicated with a help code. Following is monitored:
- High voltage technology
- Pneumatic system
- Power supply

Help codes
The error diagnosis codes (help codes) are shown in rot on the A5 display.

The help codes are stored in an error list in the order of their appearance. Each error in the list must be individually acknowledged with the keys T10 or T11.

The errors are displayed in the order of their appearance. The T10 and T11 keys cannot be used for other functions, as long as an error code is still shown.

Here is a list of all possible error functions for the CG09-P manual gun control unit:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Criteria</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| H05  | Purge valve  | - Purge valve not connected  
- Valve defective  
- Connection cable defective  
- Hardware defective       | contact Gema Service                                                      |
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Possible Causes</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>H06</td>
<td>Trigger valve</td>
<td>Solenoid coil current lower than preset limiting value</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Valve defective, main board or cable defective</td>
<td></td>
</tr>
<tr>
<td>H07</td>
<td>Spraying air flow too high</td>
<td>The preset value for spraying air is too high compared to the transport air setting</td>
<td>Lower spraying air value or increase value for transport air to equalize air volumes to the dense phase pump, delete error code</td>
</tr>
<tr>
<td></td>
<td>(Setting of spraying air on the display)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H08</td>
<td>Transport air volume too high</td>
<td>The preset value for transport air is too high compared to the spraying air setting</td>
<td>Lower transport air value or increase value for spraying air to equalize air volumes to the dense phase pump, delete error code</td>
</tr>
<tr>
<td></td>
<td>(setting of powder share on the display)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H09</td>
<td>Powder output higher than 100%</td>
<td>The powder output multiplied by the powder hose length factor and daily correction value is greater than 100% Daily correction value too large</td>
<td>Reduce powder output Reduce daily correction value</td>
</tr>
<tr>
<td>H10</td>
<td>Transport air range lower deviation</td>
<td>The theoretical value for transport air falls below minimum Total air is smaller than minimum</td>
<td>Limit transport air to their minimum value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>High voltage:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H11</td>
<td>Gun error</td>
<td>No vibrations in the oscillator, cable break, oscillator or gun is defective</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H14</td>
<td>Offset spray current measurement</td>
<td>Grounded current measurement</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Power supply:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H21</td>
<td>Undervoltage +15V supply</td>
<td>Power pack defective or overloaded</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>EEPROM (equipment memory):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H24</td>
<td>EEPROM content invalid</td>
<td>EEPROM error</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H25</td>
<td>Timeout during EEPROM writing</td>
<td>EEPROM error</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H26</td>
<td>Values not correctly stored in EEPROM during switching off</td>
<td>EEPROM error</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H27</td>
<td>EEPROM verification erroneous</td>
<td>EEPROM error</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Throttle motors:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H60</td>
<td>Transport air reference position not found</td>
<td>Throttle motor or needle jammed, limit switch defective, error in motor throttle</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H61</td>
<td>Spraying air reference position not found</td>
<td>Throttle motor or needle jammed, limit switch defective, error in motor throttle</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H62</td>
<td>Electrode rinsing air reference position not found</td>
<td>Throttle motor or needle jammed, limit switch defective, error in motor throttle</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H63</td>
<td>Fluidizing air reference position not found</td>
<td>Throttle motor or needle jammed, limit switch defective, error in motor throttle</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>H64</td>
<td>Transport air throttle does not move</td>
<td>Short circuit in limit switch, motor throttle defective</td>
<td>contact Gema Service</td>
</tr>
<tr>
<td>Code</td>
<td>Issue Description</td>
<td>Cause</td>
<td>Contact</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------</td>
<td>------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>H65</td>
<td>Spraying air throttle does not move</td>
<td>Short circuit in limit switch, motor throttle defective</td>
<td>Gema Service</td>
</tr>
<tr>
<td>H66</td>
<td>Electrode rinsing air throttle does not move</td>
<td>Short circuit in limit switch, motor throttle defective</td>
<td>Gema Service</td>
</tr>
<tr>
<td>H67</td>
<td>Fluidizing air throttle does not move</td>
<td>Short circuit in limit switch, motor throttle defective</td>
<td>Gema Service</td>
</tr>
<tr>
<td>H68</td>
<td>Transport air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>Gema Service</td>
</tr>
<tr>
<td>H69</td>
<td>Spraying air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>Gema Service</td>
</tr>
<tr>
<td>H70</td>
<td>Electrode rinsing air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>Gema Service</td>
</tr>
<tr>
<td>H71</td>
<td>Fluidizing air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>Gema Service</td>
</tr>
</tbody>
</table>

**Help codes list**

The last appeared four errors are stored in a list by the software. If an error appears, which is already in the list, he will not be listed again.

**Appearance of errors**

It is possible that an error is only displayed for a short time, but after the acknowledgement it will disappear. In this case, it's recommended to switch off the control unit and switch it on again (reset by restarting).
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 CG09-P
  Serial number 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 bulk stock is always marked with an *.

Wearing parts are always marked with a #.

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

Example:

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

WARNING!
Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!
### CG09-P Manual gun control unit

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CG09-P Manual gun control unit - complete</td>
<td>1008 780</td>
</tr>
<tr>
<td>2</td>
<td>Cover</td>
<td>1008 301</td>
</tr>
</tbody>
</table>

![Diagram of CG09-P Manual gun control unit](image_url)

**CG09-P Manual gun control unit**

![Image of CG09-P Manual gun control unit cover](image_url)
### CG09-P – Front plate

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front plate - complete</td>
<td>1007 049</td>
</tr>
<tr>
<td>2</td>
<td>LCD Display</td>
<td>1007 044</td>
</tr>
<tr>
<td>3</td>
<td>ON / OFF Print</td>
<td>1007 045</td>
</tr>
<tr>
<td>4</td>
<td>Mainboard</td>
<td>1007 046</td>
</tr>
</tbody>
</table>
CG09-P – Front plate

Front view

Rear view

1
2
3
4
**CG09-P – Rear wall**

<table>
<thead>
<tr>
<th></th>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor throttle for Fluidizing air - complete</td>
<td>1008 012</td>
</tr>
<tr>
<td>2</td>
<td>Fluidizing pad - 1/8&quot;a</td>
<td>237 264</td>
</tr>
<tr>
<td>3</td>
<td>Distribution block - complete</td>
<td>1007 036</td>
</tr>
<tr>
<td>4</td>
<td>Solenoid valve - Ø 8-Ø 8 NW3.4, 24 VDC</td>
<td>1003 914</td>
</tr>
<tr>
<td>5</td>
<td>Motor throttle for Transport air, Spraying air or Electrode rinsing air - complete</td>
<td>1000 064</td>
</tr>
<tr>
<td>6</td>
<td>O-ring - Ø 12x1.5 mm, NBR70</td>
<td>261 416</td>
</tr>
<tr>
<td>7</td>
<td>Rear panel gasket</td>
<td>1007 033</td>
</tr>
</tbody>
</table>
CG09-P – Rear wall
**CG09-P – Power pack**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power pack - complete</td>
<td>1007 546</td>
</tr>
<tr>
<td>2</td>
<td>Mainboard power supply</td>
<td>1007 838</td>
</tr>
</tbody>
</table>
CG09-P – Power pack
## CG09-P – Connections

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hose connection - Ø 8/6 mm, complete</td>
<td>1004 184</td>
</tr>
<tr>
<td>1.1</td>
<td>Nut with kink protection – M12x1 mm, Ø 8 mm</td>
<td>201 316</td>
</tr>
<tr>
<td>2</td>
<td>Rectus quick release connection - complete</td>
<td>1004 181</td>
</tr>
<tr>
<td>2.1</td>
<td>Quick release connection - NW5, Ø 6 mm</td>
<td>200 840</td>
</tr>
<tr>
<td>3</td>
<td>Power supply connection</td>
<td>1007 835</td>
</tr>
<tr>
<td>3.1</td>
<td>Mains cable (CH)</td>
<td>382493</td>
</tr>
<tr>
<td>3.2</td>
<td>Mains cable (Schuko)</td>
<td>382 485</td>
</tr>
<tr>
<td>3.3</td>
<td>Mains cable (USA)</td>
<td>382 507</td>
</tr>
<tr>
<td>3.4</td>
<td>Mains cable (GB)</td>
<td>382 515</td>
</tr>
<tr>
<td>3.5</td>
<td>Mains cable (AUS)</td>
<td>382 523</td>
</tr>
<tr>
<td>3.6</td>
<td>Mains cable (China)</td>
<td>1000 993</td>
</tr>
<tr>
<td>4</td>
<td>Dense phase pump connection – complete</td>
<td>1004 144</td>
</tr>
<tr>
<td>5</td>
<td>Gun connection</td>
<td>1007 839</td>
</tr>
<tr>
<td>10</td>
<td>Grounding cable - complete</td>
<td>301 140</td>
</tr>
<tr>
<td>11</td>
<td>Lead-through connection - Ø 8 mm, -1/4&quot;i</td>
<td>253 901</td>
</tr>
</tbody>
</table>
CG09-P – Connections

1. Power IN
2. Ext.
3. Gun
4. Main air IN
5. 1.1 63 bar or PSI
6. 1.2
7. 1.3
8. 1.4
9. 1.5
10. 2.1
11. 3.1
12. 3.2
13. 3.3
14. 3.4
15. 3.6
16. 4
17. 5
18. 10
# Diffuser

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adaptor piece</td>
<td>1005 260</td>
</tr>
<tr>
<td>2</td>
<td>Fluidizing tube</td>
<td>1005 262</td>
</tr>
<tr>
<td>3</td>
<td>O-ring - Ø 19x1.5 mm</td>
<td>1005 749</td>
</tr>
<tr>
<td>4</td>
<td>Connector</td>
<td>1005 261</td>
</tr>
<tr>
<td>5</td>
<td>O-ring - Ø 12x1.5 mm</td>
<td>1000 822</td>
</tr>
<tr>
<td>6</td>
<td>Elbow joint - 1/8&quot;a, Ø 6 mm</td>
<td>254 061</td>
</tr>
</tbody>
</table>

*OptiSpray F - diffuser*