Operating instructions and spare parts list

OptiStar CG07
Manual gun control unit

Order no. 1004 068
Documentation OptiStar CG07 Manual gun control unit

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<th>Page</th>
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<td>Manual gun control unit - outside rear wall</td>
<td>53</td>
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</tr>
<tr>
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<td>55</td>
</tr>
</tbody>
</table>
General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiStar CG07 Manual gun control unit.

These safety regulations must be read and understood before the OptiStar CG07 Manual gun control unit is used.

Safety symbols (pictograms)

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

DANGER!
Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

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

INFORMATION!
Useful tips and other information

Conformity of use

1. The OptiStar CG07 Manual gun control unit 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 OptiStar CG07 Manual gun control unit is to be used for other purposes or other substances outside of our guidelines then Gema Switzerland GmbH should be consulted.

3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of
use. The OptiStar CG07 Manual gun control unit 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 OptiStar CG07 Manual gun control unit has been set up and wired according to the guidelines for machinery (2006/42 EG). EN 60204-1 (machine safety) must also be observed.

5. Unauthorized modifications to OptiStar CG07 Manual gun control unit 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.

<table>
<thead>
<tr>
<th>Explosion protection</th>
<th>Protection type</th>
<th>Temperature class</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE  II (2) 3 D</td>
<td>IP6x FM IP54</td>
<td>T6 (zone 22)</td>
</tr>
</tbody>
</table>

Technical safety regulations for stationary electrostatic powder spraying equipment

General information

The powder spraying equipment from 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 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 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. 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 units for the spray guns must only be set up and used in zone 22. The spray guns are permitted in the zone 21 created by them.

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 care about 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 for specifying 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 announced 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 must amount to maximally 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 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 Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The Gema Switzerland GmbH 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 must amount to maximally 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 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*

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGV A1</td>
<td>Prevention principles</td>
</tr>
<tr>
<td>BGV A3</td>
<td>Electrical equipment and material</td>
</tr>
<tr>
<td>BGI 764</td>
<td>Electrostatic coating</td>
</tr>
<tr>
<td>BGR 132</td>
<td>Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (guideline &quot;Static Electricity&quot;)</td>
</tr>
</tbody>
</table>
### VDMA 24371
Guidelines for electrostatic coating with synthetic powder
- Part 1 General requirements
- Part 2 Examples of use

### EN European standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL94/9/EC</td>
<td>The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres</td>
</tr>
<tr>
<td>EN 12100-1, EN 12100-2</td>
<td>Machine safety</td>
</tr>
<tr>
<td>EN IEC 60079-0</td>
<td>Electrical equipment for locations where there is danger of explosion</td>
</tr>
<tr>
<td>EN 50 050</td>
<td>Electrical apparatus for potentially explosive atmospheres - electrostatic hand-held spraying equipment</td>
</tr>
<tr>
<td>EN 50 053, part 2</td>
<td>Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials - hand-held electrostatic powder spray guns</td>
</tr>
<tr>
<td>EN 50 177</td>
<td>Stationary electrostatic spraying equipment for flammable coating powder</td>
</tr>
<tr>
<td>EN 12981</td>
<td>Coating plants - spray booths for application of organic powder coating material - safety requirements</td>
</tr>
<tr>
<td>EN 60 529, identical: DIN 40050</td>
<td>IP-Type protection: contact, foreign bodies and water protection for electrical equipment</td>
</tr>
<tr>
<td>EN 60 204, identical: DIN VDE 0113</td>
<td>VDE regulations for the setting up of high voltage electrical machine tools and processing machines with mains voltages up to 1000 V</td>
</tr>
</tbody>
</table>

### VDE (Association of German Engineers) Regulations

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN VDE 0100</td>
<td>Regulations for setting-up high voltage equipment with mains voltages up to 1000 V</td>
</tr>
<tr>
<td>DIN VDE 0105, part 1</td>
<td>VDE regulations for the operation of high voltage equipment</td>
</tr>
<tr>
<td>DIN VDE 0105, part 4</td>
<td>General regulations</td>
</tr>
<tr>
<td>DIN VDE 0147, part 1</td>
<td>Supplementary definitions for stationary electrical spraying equipment</td>
</tr>
<tr>
<td>DIN VDE 0165</td>
<td>Setting up stationary electrostatic spraying equipment</td>
</tr>
<tr>
<td>DIN VDE 0165</td>
<td>Setting up electrical equipment in locations in areas with danger of explosion</td>
</tr>
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</table>

*Sources:

1) Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association
2) Beuth Verlag GmbH, Burgrafenstrasse 4, 1000 Berlin 30
3) General secretariat, Rue Bréderode 2, B-1000 Bruxelles, or the appropriate national committee
4) VDE Verlag GmbH, Bismarckstrasse 33, 1000 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 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 OptiStar CG07 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 function mode of the individual system components - booth, gun control unit, manual gun or powder injector - should be referenced to their corresponding documents.

Software version

This document describes the operation of the OptiStar CG07 Gun control unit, with software version starting from 1.05!
Function description

Field of application

The OptiStar CG07 Manual gun control unit is designed exclusively for controlling the Gema powder coating guns (see also in chapter "Technical Data").

Any other use, beyond the above mentioned is considered non-conforming. The manufacturer is not responsible for any damage resulting from this; the risk for this is assumed by the user alone.

For a better understanding of the relationships in powder coating, it is recommended to read the operating instructions of other components, thoroughly, so as to be familiar with their functions also.

OptiFlex manual equipment

Following OptiFlex manual equipment types are available:
- OptiFlex B (with powder box)
- OptiFlex F (with fluidized powder hopper)
- OptiFlex S (with stirrer container)

OptiStar CG07 Manual gun control unit

Typical characteristics

- The OptiStar CG07 Manual gun control unit is used for electrostatic powder coating with OptiFlex manual equipment (fluidizing-, box- or stirrer device)
- The OptiStar CG07 Manual gun control unit allows the configuration of process parameters (air settings, high voltage settings), system parameters, process data, status information and the powder hose correction values. All air volumes can be controlled centrally by the unit
- The handling is simple and self-explanatory
- The coating personnel can save individual settings based off personnel experience
- All settings for efficient powder coating are simple to operate and repeatable. The control unit electronics permit the exact
amount of powder delivery and the adjusted values can be read on the digital displays
- The OptiStar CG07 Manual gun control unit can be connected to all usual mains voltages between 100-240 VAC, 50-60 Hz, single phase
- Attention - the vibrating motor requires 100/110/220 VAC depending on country mains supply

**Basic functions**
- Intuitive operation
- Setting and display of the values on two levels
- Saving/recalling of process parameters in the form of programs
- Remote control option on the manual powder gun (OptiSelect GM02 only)

**Additional functions**
- Spray current regulation with high voltage limitation
- Control of the air volumes
- Controlling of the stirrer and the vibrator
- Status indications and error diagnosis

**Operating modes**

The OptiStar CG07 Manual gun control unit can be operated with two operating modes. According to the selected application mode, the spray voltage and the spray current are automatically adjusted and limited.

**Predefined operating mode (Preset mode)**
The CG07 Gun control unit provides three predefined application modes (flat parts, complicated parts and recoat parts already painted one time). When operating in this mode, the spray voltage and spray current are automatically set and limited.

In this operating mode, current (µA) and high voltage (kV) are preset, powder and air volume can be adjusted and saved. The powder and air volume are stored separately for each predefined application mode.

**User-defined 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 specified values in the 20 programs and 3 application modes are saved automatically, without confirmation, after a two second delay and the display changes from preset values to actual values!
Technical Data

OptiStar CG07 Manual gun control unit

Connectable guns

<table>
<thead>
<tr>
<th>OptiStar CG07</th>
<th>connectable</th>
</tr>
</thead>
<tbody>
<tr>
<td>OptiSelect GM02</td>
<td>yes</td>
</tr>
<tr>
<td>OptiGun GA02</td>
<td>only with trigger adapter</td>
</tr>
<tr>
<td>PG1</td>
<td>yes</td>
</tr>
<tr>
<td>PG2-A / PG2-AX</td>
<td>only with trigger adapter</td>
</tr>
<tr>
<td>PG3-E**</td>
<td>yes</td>
</tr>
<tr>
<td>TriboJet*</td>
<td>yes, with adapter</td>
</tr>
</tbody>
</table>

* The gun type must be adjusted (reference chapter "Additional options"). The Tribo gun is not type approved (ATEX).

** Only for enamel powder, the gun is not type approved (ATEX).

Attention:
The OptiStar CG07 Manual gun control unit can only be used with the specified gun types!

Electrical data

<table>
<thead>
<tr>
<th>OptiStar CG07</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains input voltage</td>
<td>100-240 VAC</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>50-60 Hz</td>
</tr>
<tr>
<td>Input power (without vibrator)</td>
<td>40 VA</td>
</tr>
<tr>
<td>Nominal output voltage (to the gun)</td>
<td>max. 12 V</td>
</tr>
<tr>
<td>Nominal output current (to the gun)</td>
<td>max. 1 A</td>
</tr>
<tr>
<td>Vibrator connection and power (on the Aux output)</td>
<td>110/220 VAC max. 100W</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP6x</td>
</tr>
<tr>
<td></td>
<td>FM</td>
</tr>
<tr>
<td></td>
<td>IP54</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0°C - +40°C (+32°F - +104°F)</td>
</tr>
<tr>
<td>Max. operating temperature</td>
<td>85°C (+185°F)</td>
</tr>
</tbody>
</table>
OptiStar CG07

Approvals

 PTB05 ATEX 5009

<table>
<thead>
<tr>
<th>Pneumatic data</th>
</tr>
</thead>
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<td><strong>OptiStar CG07</strong></td>
</tr>
<tr>
<td>Compressed air connection (on control unit)</td>
</tr>
<tr>
<td>Compressed air main connection (on filter unit)</td>
</tr>
<tr>
<td>Max. input pressure</td>
</tr>
<tr>
<td>Min. input pressure (while unit in operation)</td>
</tr>
<tr>
<td>Max. water vapor content of the compressed air</td>
</tr>
<tr>
<td>Max. oil vapor content of the compressed air</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OptiStar CG07</strong></td>
</tr>
<tr>
<td>Width</td>
</tr>
<tr>
<td>Depth</td>
</tr>
<tr>
<td>Height</td>
</tr>
<tr>
<td>Weight</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air flow rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>The total air consists of conveying air and supplementary air, in relation to the selected powder quantity (in %). Hereby, the total air volume is maintained constant. For explanation, see the following examples with correction factor C0=1.0 and conveying air nozzle=1.4 mm:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OptiStar CG07</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total air</strong></td>
</tr>
<tr>
<td>6.5 Nm³/h</td>
</tr>
<tr>
<td>40 %</td>
</tr>
<tr>
<td>0 %</td>
</tr>
<tr>
<td>5.5 Nm³/h</td>
</tr>
<tr>
<td>50 %</td>
</tr>
<tr>
<td>0 %</td>
</tr>
<tr>
<td>4.0 Nm³/h</td>
</tr>
<tr>
<td>50 %</td>
</tr>
<tr>
<td>0 %</td>
</tr>
</tbody>
</table>
### OptiStar CG07

<table>
<thead>
<tr>
<th>Flow rate - fluidizing air:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OptiFlex B</td>
<td>0-1.0 Nm³/h</td>
</tr>
<tr>
<td></td>
<td>(Factory default - 0.2 m³/h for all application modes)</td>
</tr>
<tr>
<td>OptiFlex F (no hopper fluidization or Airmover)</td>
<td>0-5.0 Nm³/h</td>
</tr>
<tr>
<td></td>
<td>(Factory default - 1.0 m³/h for all application modes)</td>
</tr>
<tr>
<td>OptiFlex S</td>
<td>0-1.0 Nm³/h</td>
</tr>
<tr>
<td></td>
<td>(Factory default - 0.2 m³/h for all application modes)</td>
</tr>
</tbody>
</table>

| Flow rate - electrode rinsing air     | 0-3.0 Nm³/h       |
|                                      | (Factory default - 0.2 m³/h for all application modes) |

| Flow rate - conveying air            | 0-5.4 Nm³/h       |
|                                      | (Factory default - 60% for all application modes, m³/h based on presets) |

| Flow rate - supplementary air         | 0-4.5 Nm³/h       |
|                                      | (Factory default - 4.0 m³/h for all application modes) |

**Note:**
The total air consumption of the equipment consists, depending on the device type, of the 4 adjusted air values (without air mover air value on OptiFlex F). These values are valid only for an internal control pressure of 5,5 bar (when unit powered on and gun trigger pulled, 6 Nm³/h)!
Operating and display elements

Displays and LEDs

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1-A4</td>
<td>Display of actual / 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>L1</td>
<td>Powder output display (in %)</td>
</tr>
<tr>
<td>L2</td>
<td>Total air volume display (in Nm³/h)</td>
</tr>
<tr>
<td>L3</td>
<td>Spray current display (in µA)</td>
</tr>
<tr>
<td>L4</td>
<td>Fluidizing display (in Nm³/h)</td>
</tr>
<tr>
<td>L5</td>
<td>High voltage display (in kV)</td>
</tr>
<tr>
<td>L6</td>
<td>Electrode rinsing air display (in Nm³/h)</td>
</tr>
<tr>
<td>L7</td>
<td>Activation of vibration/fluidization</td>
</tr>
<tr>
<td>L13</td>
<td>Application mode for flat parts is activated</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>
<tr>
<td>T12 (P)</td>
<td>Program selection for user-defined programs (max. 20)</td>
</tr>
<tr>
<td>T13</td>
<td>Application mode for flat parts (fixed values)</td>
</tr>
<tr>
<td>T14</td>
<td>Application mode for complicated parts with depressions (fixed values)</td>
</tr>
<tr>
<td>T15</td>
<td>Application mode for overcoating parts already coated (fixed values)</td>
</tr>
<tr>
<td>T16</td>
<td>Switching on and off the fluidization (OptiFlex F)</td>
</tr>
<tr>
<td></td>
<td>Switching on and off the vibration and the fluidization (OptiFlex B)</td>
</tr>
<tr>
<td></td>
<td>Switching on and off the stirrer (OptiFlex S)</td>
</tr>
<tr>
<td></td>
<td>Switch to system parameter mode (press for 5 seconds)</td>
</tr>
<tr>
<td>S1/S2</td>
<td>Power switch On/Off</td>
</tr>
</tbody>
</table>
General information

Display of the programs
The number of the adjusted program is shown on display A5. A P=Program is placed in front of the two digit program number as a reference.

Display of the values

Display of the actual values
The actual values are shown on the displays A1-A4. By operating the keys T1-T8 and T12-T15, preset values display will be switched over.

Display of the preset values/setting values
The preset values are shown on the displays A1-A4. If no operation takes place during 3 seconds, the actual values displayed will be switched over.

Edit and save the preset values
The preset values can be adjusted in steps by ± 1 with the keys T1-T8. Modified preset values are saved automatically, after 2 seconds, in the current program.

Change between program and application mode
Pressing the keys T10 and T11 in one of the three predefined application modes (Preset mode), causes the unit to change to the user-defined programs. These keys also allow the change of programs in the program mode.

The simultaneous operation of the + and - key on the back of the powder gun (OptiSelect gun) causes the control unit to rotate between the 3 predefined programs (Preset mode) and the first (P1) user-defined program (Program mode).

Viewing of preset values
To change from the actual value to the preset value display without changing a preset value at the same time, the corresponding keys must be lightly touched.

Example:
Lightly touching key T1 indicates the preset values, pushing harder on this key, reduces the powder output. This behavior does not apply to the program select keys, where the program number is directly changed.
### Connections

**OptiStar CG07 Gun control unit - connections on the rear wall**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Air Supply IN</td>
<td>Compressed air connection (6-10 bar / 87-145 PSI)</td>
</tr>
<tr>
<td>2.1 Power IN</td>
<td>Mains cable connection (100-240 VAC)</td>
</tr>
<tr>
<td>2.2 Aux</td>
<td>Vibration motor connection for OptiFlex B</td>
</tr>
<tr>
<td>2.3 Gun</td>
<td>Gun cable connection</td>
</tr>
<tr>
<td>1.5</td>
<td>Fluidizing air connection</td>
</tr>
<tr>
<td>1.4</td>
<td>Electrode rinsing air connection</td>
</tr>
<tr>
<td>1.3</td>
<td>Supplementary air connection</td>
</tr>
<tr>
<td>1.2</td>
<td>Conveying air connection</td>
</tr>
<tr>
<td></td>
<td>Grounding connection</td>
</tr>
</tbody>
</table>

---

**OptiStar CG07 Manual gun control unit**

Start-up and operation  •  25
Connection guide

1. Check the compressed air connection from filter unit to control unit. Connect the compressed air supply hose from the compressed air circuit directly to the filter unit main connection on the rear side of the equipment (1/4" female BSP).

**Note:**
The compressed air must be free from oil and water!

2. Connect the black hose for fluidizing air (electrically conductive) to the output 1.5 on the rear side of the control unit.

3. Connect the grounding cable to the control unit with the grounding screw, and the 5 m long grounding cable with the clamping clip to the booth or the conveyor. Check ground connections with Ohm meter and ensure 1 MΩ or less.

4. Connect the gun cable plug to the socket 2.3 on the rear side of the control unit.

5. Connect the rinsing air hose to the electrode rinsing air output 1.4 and to the powder gun.

6. Insert the injector, connect the powder hose to the injector and to the powder gun.

7. Connect the red hose for conveying air to the corresponding output 1.2 on the rear side of the control unit and to the injector.

8. Connect the black hose for supplementary air to the corresponding output 1.3 on the rear side of the control unit and to the injector (this hose is electrically conducting).

9. Connect the mains cable to the **2.1 Power IN** plug and tighten with provided screw.

**Note:**
If no vibration motor (OptiFlex B) is connected, the 2.2 Aux output is to be locked tightly with the provided protection cap!
Pin assignment

**Power IN connection**
1. Neutral conductor (power supply)
2. Phase conductor (100-240 VAC)
3. Stirrer output
PE  Ground PE

**Aux connection**
1. Vibrator phase output
2. Neutral conductor
3. Not used
PE  Ground PE

**Gun connection**
1. Ground
2. Remote control 1 (GM02)
3. Chassis ground
4. Trigger
5. Remote control 2 (GM02)
6. Oscillator
PE  Ground PE
Initial start-up

Setting the device type

Adjust the corresponding device type (fluidizing, box or stirrer device) by pressing the key T16 (see chapter "System parameter P0" for more details).

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

Manual devices are subdivided into fluidizing, box or stirrer types. These types differ in the control of the vibrator output and the behavior of the fluidizing air.

<table>
<thead>
<tr>
<th>Device type</th>
<th>AUX output function</th>
<th>Fluidizing air function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluidizing device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OptiFlex F)</td>
<td>Always Off (no vibration)</td>
<td>Fluidizing air is controlled by two different methods: Turning on the fluidization key T16 will feed air to the hopper until key is turned off Triggering the gun is turning on the fluidization too, fluidization can be turned off with key T16</td>
</tr>
<tr>
<td>Box device</td>
<td>Vibration On during triggering, delay of 1 minute after releasing gun trigger The key T16 switches the vibration On and Off (after 1 min. the vibration switches Off automatically)</td>
<td>Fluidizing air is switched On parallel by the trigger. It runs after for 1 minute The key T16 switches the fluidization On and Off parallel to the vibration</td>
</tr>
<tr>
<td>(OptiFlex B)</td>
<td>Stirrer On when gun triggered</td>
<td>No fluidization, no function of key T16</td>
</tr>
<tr>
<td>Stirrer device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OptiFlex S)</td>
<td>Stirrer On when gun triggered</td>
<td>Fluidization is switched On and Off with trigger The key T16 switches Off the fluidization, it can only be turned On by pressing the key again</td>
</tr>
<tr>
<td>Manual unit with fluidization</td>
<td>Stirrer On when gun triggered</td>
<td></td>
</tr>
<tr>
<td>(OptiFlex S Fd)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
The system parameter P0 of the manual unit may not be set on 3 (automatic unit)! A wrong parameterization leads to various malfunctions!
Preparing the powder hopper/container

Prepare the powder hopper or powder box according to manual equipment type (OptiFlex F, B, S, L etc.), reference the operating manual for the equipment type being used.

Switch on the booth

Switch on the powder coating booth according to its operating manual.

Daily start up

The daily start-up of the OptiStar CG07 Manual gun control unit takes place by the following steps:

Select the operating mode

Select the application mode with three predefined modes (Preset mode) or the user-defined program mode with 20 user-defined programs (Program mode).

1. Turn on the gun control unit with the **ON** key
2. Select the corresponding application mode with key **T12** (for Program mode) or keys **T13/T14/T15** (for Preset mode)

The predefined mode automatically set values for high voltage and spraying current:

<table>
<thead>
<tr>
<th>Presetting</th>
<th>Desired µA</th>
<th>Desired kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat parts</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Complicated parts</td>
<td>22</td>
<td>100</td>
</tr>
<tr>
<td>Overcoating</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

Predefined application mode (Preset mode)

Select the preset mode with the application keys **T13/T14/T15**. The LED of the corresponding key illuminates. No program number will be shown on the display **A5**. The air values can be individually specified and are automatically stored in the corresponding program.

**Application mode for flat parts**

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

**Application mode for complicated parts**

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

**Application mode for recoating parts already coated**

This application mode is suitable for recoating of workpieces which are already coated.
Exiting the Preset mode

Exit the Preset mode with the keys T10, T11 or T12. The preset values of the Program mode used before the Preset mode are displayed by the control unit memory.

User-defined mode (Program mode)

Select this application mode with the key T12. Here, 20 user-defined programs can be set and saved. The programs 1-20 were loaded with presets by factory (4.0 Nm³/h total air, 60% powder output, 80 kV high voltage, 80 µA spray current, 0.2 Nm³/h electrode rinsing air and 1.0 Nm³/h fluidizing air).

Setting powder output and powder cloud

The powder output is dependent on the selected powder amount (in %) and the adjusted total air volume.

Setting the total air volume

1. Adjust the total air volume with the keys T3/T4 (see also the injector 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)
   - The selection takes place with the keys T1/T2 on the control unit or with the +/- keys on the rear side of the powder gun (OptiSelect gun type). Factory default setting of 60% is recommended for initial spraying. The total air volume is thereby kept constant automatically by the control unit
2. Check the powder fluidizing in the hopper and ensure you have a small simmer or very low boiling action
3. Point the gun into the booth, press the gun trigger and visually check the powder output

Note:
As a factory default value, a powder rate of 60% and a total air volume of 4 Nm³/h are recommended. By inserting values, which the equipment cannot convert, the operator is made aware by flashing of the appropriate display and a temporary out of range message!

Setting the electrode rinsing air

1. Adjust the correct electrode rinsing air according to the applied nozzles (deflector plate, flat jet nozzle), see note below for default/starting values
   - Press key T9 (SELECT)
     The second display level is switched over
   - Press keys T7/T8:
     Here, the corresponding air volume value is entered
- If this display level is not operated for 3 seconds, the first display level is switched over independently

**Note:**
By using flat jet nozzles, the factory default value is approx. 0.2 Nm³/h, by using round jet nozzles with air-rinsed deflector plates, the factory default value is approx. 0.5 Nm³/h!

### Setting the fluidizing

The fluidizing can be adjusted on the OptiFlex B, OptiFlex S and OptiFlex F manual device.

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

**Procedure:**

1. Adjust the air mover by turning the ball valve fully open and adjusting needle valve as required. The ball valve and needle valve are located on the air mover (OptiFlex F)
2. Open the powder hopper cover
3. Press key **T9 (SELECT)**
   - The second display level is switched over
4. Adjust the fluidizing air with the keys **T5/T6**
   - If the adjustment keys (+ or -) are not operated after 3 seconds, the display will go back to the µA display
   - The powder should “simmer” inside the hopper. Occasional mixing of the powder might be required
5. Close the cover again
6. According to the device type, stirrer, vibration and/or fluidizing can be switched on now

### Powder coating

**Attention:**
Make sure first, that all electrically conductive parts within 5 m of the coating booth are grounded!

1. Take the gun into the hand and hold it into the coating booth, but do not yet direct it to the object to be coated
2. Select the operating mode:
   - Select the operating mode with program key **T12** or application keys **T13/T14/T15**. The LED of the corresponding application key illuminates
3. Adjust powder delivery and total air settings as required. This will need to be done as the gun is triggered to visualize the spray pattern
4. Press the powder gun trigger
5. Coat the objects
Remote control by GM02 manual gun

Various functions can be remotely controlled with the + and - keys on the back side of the powder gun (OptiSelect gun type):

- Adjust the powder output by pressing the + or - key on the gun. The powder output will be increased or decreased accordingly.

- Change application modes (Preset mode/Program mode) by pressing the + and - keys on the gun at the same time. The change takes place counterclockwise. Check by observing the key LEDs on the control unit.

Note:
By pressing one of the keys, the preset values display will be shown!

Shut-down

The shut-down of the OptiStar CG07 Manual gun control unit takes place in following steps:

1. Remove the powder gun trigger
2. Switch off the control unit
3. Switch off the Airmover (OptiFlex F)

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

If in disuse during several days

1. Remove the mains plug
2. Clean the coating equipment (see the corresponding operating manual)
3. Turn off the compressed air main supply

Saving programs

Note:
The values in programs 1-20 and the 3 preset application modes are saved automatically, without confirmation!
Technical explanations concerning high voltage and spray current

Characteristic curves of Preset mode

The preset values for high voltage and spray current in the predefined operation mode (Preset mode) are to be taken as reference points. The modification of these values has effects on the characteristic curve of the gun (see diagram). The operator can optimize the values within the possible ranges.

Characteristic curves of Preset mode

Characteristic curve of Program mode

In the user-defined operating mode (Program mode), the values for high voltage and spray current are free adjustable. The user can optimize the values for his application by utilizing the ranges below (see diagram).
Additional options

System parameter P0

Configure the OptiStar CG07 Manual gun control unit with the system parameter P0, which determines the device type (F, B, S etc.). This value will automatically be saved in the control unit memory once set.

**Entering the system parameter**

1. To enter the system parameter mode, press and hold the key T16 until the displays changes (approx. 5 seconds)
2. The system parameter number is shown in the display A1 with a P
3. Adjust the corresponding system parameter value (device type) with the keys T5/T6.
   The value of the adjusted system parameter appears on display A3

<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) 1 - Box device (Vibr.) (type B) 2 - Stirrer device (type S) 3 - Automatic device 4 - Man. equip. with fluidization</td>
<td>F B S A S Fd</td>
</tr>
</tbody>
</table>

**Notice:**
The manual equipment with fluidization (S Fd) is used if an OptiFlex 1/2-S has a fluidization.

In the case of a OptiFlex 2-F double equipment, the device without fluidization air connection has the S-type parameterization (P0 = 2).

**Exiting the system parameter mode**

Exit the system parameter mode with the key T16 and the display will switch to actual values. The modified values will be saved in the equipment memory.

If the equipment is switched off while in the system parameters mode, any changes made will not be stored by the equipment memory.
Trigger counter and software request

The status information 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 T10 or T11 depending on requested information.

<table>
<thead>
<tr>
<th>Status information</th>
<th>Key combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger hours counter (total time in hours of gun</td>
<td>T12 with T10</td>
</tr>
<tr>
<td>trigger time). The trigger counter can’t be reset!</td>
<td></td>
</tr>
<tr>
<td>Software version</td>
<td>T12 with T11</td>
</tr>
</tbody>
</table>

The status display is shown as long as a key is held.

Keyboard lock

The OptiStar CG07 Manual gun control unit contains a keyboard lock, which prevents changing individual values for each parameter (kV, µA etc.) within an application mode (Preset or Program). The following is not affected by the keyboard lock and will still operate under normal conditions:

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

The keyboard lock is activated and deactivated by pressing and holding key T9 (SELECT) and then key T11, the LED L11 (REMOTE) is flashing.

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

Operation with other guns

Operation and configuration of the Tribo gun

Connect the Tribo gun to the OptiStar CG07 Manual gun control unit with the corresponding adapter. The Tribo gun can be configured by holding the keys T7 and T8 when switching on. The selected adjustment remains stored, when the device is switched off. To deactivate the Tribo gun mode, repeat the steps above.

Operation of the Tribo gun without adapter

For continuous operation, the Tribo gun can be operated without corresponding adapter to the OptiStar CG07 Manual gun control unit (automatic and manual equipment). To use the Tribo gun without the Tribo adapter, move the wire from Pin 5 to Pin 1.

Attention:
This activity must be absolutely carried out by a specialist. Inappropriate operation can lead to damage to the control unit. Gema Switzerland GmbH is in no way responsible for any resulting damages!
Correction factor for powder output

The OptiStar CG07 Manual gun control unit enables the powder output correction, when using different powder hose lengths to the gun. Therefore, a powder output correction factor is required (because of the back-pressure).

Entering the correction factor

1. To enter the system parameter mode, press and hold the key T16 until the display changes (approx. 5 seconds)
2. The correction factor number is shown in the display A2 with a C
3. Adjust the corresponding correction factor value with the keys T7/T8 (setting range 0,5-3,0). The default value for manual equipment is 1,0 (6 m powder hose) and for automatic equipment 1,8 (12 m powder hose). The value of the adjusted correction factor appears on display A4

Correction factor - diagram

Influence of powder hose correction (powder hose 11 mm x 12 m)

Powder setting [%] vs. Powder output [Nm³/h]

• GL=4 Nm³/h, hose correction 1.8
• GL=4 Nm³/h, hose correction 1.0

RAM reset

The RAM reset enables a restore of factory settings of the OptiStar CG07 Manual gun control unit. All user-defined values in Program and Preset mode will be set to factory default. The adjusted device type in system parameter P0 remains stored in memory and an active keyboard lock will be deactivated.

Execute the RAM reset by pressing the key T16 and the ON switch for 5 seconds.
Powder preparation

The preparation of the coating powder for conveying takes place principally by fluidization and vibration or stirrer. Fluidization and vibration or stirrer are switched on and off with the key T16. Depending on the manual equipment type, additional functions are available.

The activated fluidization and vibration status is indicated by the L7 LED on the display.

OptiFlex F (with fluidized powder hopper)

The fluidization is switched on by gun triggering or pressing the key T16. If the gun trigger has been released for one minute, the fluidization will automatically turn off. Upon engaging gun trigger again, the fluidization will turn on again. This mode of operation can be override by use of the key T16. By fluidizing, the powder receives a liquid-similar consistency and can be conveyed by means of injector principle (see the injector operating manual). This manual equipment type has no vibration.

The activated fluidization and vibration status is indicated by the L7 LED on the display.

OptiFlex B (with powder box)

The fluidization and the vibration are switched on and off by gun triggering or pressing the key T16. The vibration causes the powder movement to the suction tube. If the gun trigger has been released for one minute, the fluidization will automatically turn off and after 1 minute, the vibration will turn off. By pressing the key T16, the fluidization and the vibration is switched on and off and overrides the gun trigger control.

The activated fluidization and vibration status is indicated by the L7 LED on the display.

OptiFlex S (with stirrer container)

The fluidization and the stirrer are switched on and off by gun triggering. By switching off, the wake of the stirrer is approx. 20 seconds. By pressing the key T16, the fluidization is switched on and off.

Manual equipment control without fluidization

This is used in case of a stirrer equipment with no fluidization, or a double equipment has no fluidization on the second control unit.

Note:
By resetting the RAM, all user-defined values in Program and Preset mode will be set to factory default!
Cleaning mode

The cleaning mode enables blowing off powder accumulations in the powder hose with preset air pressure. This function is a two step process to activate.

First press and hold program key T12 (approx. 3 seconds) until the circulating luminous segment is shown in display A5. Then press the gun trigger and cleaning will start.

Note:
When using OptiFlex F manual coating equipment, the injector (pump) must be disconnected prior to cleaning procedure, on OptiFlex B, the suction unit must be lifted, and on OptiFlex S, the powder container must be empty!

The cleaning mode is terminated by pressing the program key T12.
Schematic diagrams

Pneumatical diagram - OptiStar CG07

Pressure regulator

Main solenoid valve (trigger valve)

Throttle motors

Conveying air (FL)

Supplementary air (ZL)

Electrode rinsing air (EL)

Fluidizing air (FD)

Input pressure:
6-10 bar, 6 Nm³/h (during coating operation)

5.5 bar, 6 Nm³/h (during coating operation)
Troubleshooting

Repairing the electrical part of the control unit

Attention, danger!
Before starting to work on the control unit, disconnect the mains plug!

Replacing the fuse(s)

1. Loosen the screws on the front side of the housing
2. Hold the front plate with one hand, remove the fuse(s) (quick-acting) from the fuse holder and replace with a new one
3. Reattach the front plate
4. Reconnect the mains cable

Replacing the power supply board

1. Loosen the screws on the front side of the enclosure
2. Disconnect the plugs on the defective board
3. Squeeze the standoffs with a pointed pliers and remove the power supply board. Replace the defective standoffs
4. Place the new board on the standoffs, press them into the board and snap into mounting bracket within enclosure. Reconnect the plugs.
5. Reassemble the control unit in reverse order as described above and install it
6. Reconnect the mains cable

**Replacing the front plate**

1. Loosen the screws on the front side of the enclosure
2. Disconnect all plugs from the front plate
3. Replace the front plate
4. Reassemble the front plate and the control unit in reverse order as described and install it

**Attention:**
The motor plugs are to be put in according to the annotation!

5. Reconnect the mains cable

**Note:**
If there are any problems or uncertainties, please contact a Gema service center!
Repairing the pneumatic part

Replacing the pneumatic part

1. Remove every electric and pneumatic connection on the rear side of the control unit (disconnect mains cable and remove compressed air supply)
2. Loosen the screws on the rear side of the housing
3. Remove the pneumatic hoses from the part to be replaced (see chapter "Removing the pneumatic hoses")
4. Dismantle the defective part and replace it
5. Reconnect the pneumatic hoses (see chapter "Fitting the pneumatic hoses")
6. Reassemble the control unit in reverse order as described and install it

Removing the pneumatic hoses

Before replacing a pneumatic part, all corresponding pneumatic hoses should always be disconnected first. This happens by pressing the ring on the quick release coupling of the hose. The hose can be pulled out easily.

Fitting the pneumatic hoses

In order to reconnect the pneumatic hoses, proceed as follows:

- Insert the hose in the quick release coupling up to the end stop. The hose is held firmly again

Note:
If there are any problems or uncertainties, please contact a Gema service center!

Error diagnosis of the software

General information

The correct function of the OptiStar CG07 Manual gun control unit is constantly monitored. If the equipment software determines a fault, an error message is indicated with an error code. Following is monitored:

- High voltage technology
- Air technology
- Power supply
Help codes

The error diagnosis codes (error codes) are shown in the display A5. The error codes are stored in an error list in the order of their occurrence. Each error in the list must be individually acknowledged with the keys T10 or T11.

The error codes are shown with the format Hnn, whereby nn is the numeric code, if necessary with a leading zero.

The errors are displayed in the order of their occurrence. The keys T10 and T11 cannot be used for other functions, as long as an error code is shown on A5.

Here is the complete listing of all error codes possible for the OptiStar CG07 Manual gun control unit:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Criteria</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatics:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H06</td>
<td>Trigger valve (main solenoid valve)</td>
<td>Solenoid coil current lower than preset limiting value&lt;br&gt;Valve defective, main board or cable defective</td>
<td>Main solenoid valve error, connection cable from main solenoid valve to basic electronics is missing, check main solenoid valve</td>
</tr>
<tr>
<td>H07</td>
<td>Supplementary air volume too high (total air setting on display)</td>
<td>The preset value for supplementary air is too high compared to your conveying air setting</td>
<td>Reduce supplementary air value or increase conveying air volume to balance air volume to injector and clear help code</td>
</tr>
<tr>
<td>H08</td>
<td>Conveying air volume too high (powder % setting on display)</td>
<td>The preset value for conveying air is too high compared to your supplementary air setting</td>
<td>Reduce conveying air value or increase supplementary air value to balance air volume to injector and clear help code</td>
</tr>
<tr>
<td>H09</td>
<td>Powder output higher than 100%</td>
<td>The powder output multiplied with the powder hose length factor and the daily correction value is larger than 100%&lt;br&gt;Daily correction value too large</td>
<td>Reduce powder output&lt;br&gt;Reduce daily correction value</td>
</tr>
<tr>
<td>H10</td>
<td>Conveying air range lower deviation</td>
<td>The theoretical value for conveying air falls below minimum&lt;br&gt;Total air is smaller than minimum</td>
<td>Limit conveying air to conveying air minimum</td>
</tr>
<tr>
<td>High voltage:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H11</td>
<td>Gun error</td>
<td>No oscillation, cable broken, oscillator or gun defective</td>
<td>Replace gun cable, cascade etc.</td>
</tr>
<tr>
<td>Power supply:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H20</td>
<td>Overvoltage +15V supply</td>
<td>Power pack defective or overloaded</td>
<td>Replace the power pack, if error is permanent</td>
</tr>
<tr>
<td>H21</td>
<td>Undervoltage +15V supply</td>
<td>Power pack defective or overloaded</td>
<td>Replace the power pack, if error is permanent</td>
</tr>
<tr>
<td>H22</td>
<td>Undervoltage -15V supply</td>
<td>Power pack defective or overloaded</td>
<td>Replace the power pack, if error is permanent</td>
</tr>
<tr>
<td>H23</td>
<td>Undervoltage +5V supply</td>
<td>Power pack defective or overloaded</td>
<td>Replace the power pack, if error is permanent</td>
</tr>
</tbody>
</table>
### EEPROM (equipment memory):

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Criteria</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>H24</td>
<td>EEPROM content invalid</td>
<td>EEPROM error</td>
<td>Load factory settings initialize EEPROM (see therefore in chapter &quot;RAM reset&quot;)</td>
</tr>
<tr>
<td>H25</td>
<td>Timeout during EEPROM writing</td>
<td>EEPROM error</td>
<td></td>
</tr>
<tr>
<td>H26</td>
<td>Values not correctly stored in EEPROM during switching off</td>
<td>EEPROM error</td>
<td></td>
</tr>
</tbody>
</table>

### Throttle motors:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Criteria</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>H60</td>
<td>Conveying air reference position not found</td>
<td>Throttle motor or needle blocked, limit switch defective, throttle motor error</td>
<td>Calibrate again, replace throttle valve</td>
</tr>
<tr>
<td>H61</td>
<td>Supplementary air reference position not found</td>
<td>Throttle motor or needle blocked, limit switch defective, throttle motor error</td>
<td>(see above)</td>
</tr>
<tr>
<td>H62</td>
<td>Electrode rinsing air reference position not found</td>
<td>Throttle motor or needle blocked, limit switch defective, throttle motor error</td>
<td>(see above)</td>
</tr>
<tr>
<td>H63</td>
<td>Shaping air / fluidizing air reference position not found</td>
<td>Throttle motor or needle blocked, limit switch defective, throttle motor error</td>
<td>(see above)</td>
</tr>
<tr>
<td>H64</td>
<td>Conveying air throttle does not move</td>
<td>Short circuit in limit switch, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H65</td>
<td>Supplementary air throttle does not move</td>
<td>Short circuit in limit switch, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H66</td>
<td>Electrode rinsing air throttle does not move</td>
<td>Short circuit in limit switch, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H67</td>
<td>Shaping air / fluidizing air throttle does not move</td>
<td>Short circuit in limit switch, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H68</td>
<td>Conveying air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H69</td>
<td>Supplementary air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H70</td>
<td>Electrode rinsing air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>(see above)</td>
</tr>
<tr>
<td>H71</td>
<td>Shaping air / fluidizing air position lost</td>
<td>Lost steps, limit switch defective, throttle motor defective</td>
<td>(see above)</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, it will not be listed again. If the list is full, no more new entries are added.

### Appearance of errors

It is possible that an error appears just shortly, but after the acknowledgement it will disappear. In this case, switch off the OptiStar 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** OptiStar CG07 Manual gun control unit,
  **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 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)

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**WARNING!**

Only original Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!
## OptiStar CG07 Manual gun control unit

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front plate - see corresponding spare parts list</td>
<td>1001 060</td>
</tr>
<tr>
<td>2</td>
<td>Housing and power pack - see corresponding spare parts list</td>
<td>1001 060</td>
</tr>
<tr>
<td>3</td>
<td>Rear wall - see corresponding spare parts list</td>
<td>1004 426</td>
</tr>
<tr>
<td>4</td>
<td>Protective cover</td>
<td>1004 426</td>
</tr>
</tbody>
</table>

*OptiStar CG07 Manual gun control unit*
## OptiStar CG07 Manual gun control unit - rear wall

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pneumatic group - complete</td>
<td>1001 029</td>
</tr>
<tr>
<td>2</td>
<td>Throttle motor - completely assembled</td>
<td>1000 064</td>
</tr>
<tr>
<td>3</td>
<td>Main solenoid valve cable - CG07</td>
<td>1001 410</td>
</tr>
<tr>
<td>4</td>
<td>Spring washer - M3 R</td>
<td>201 880</td>
</tr>
<tr>
<td>5</td>
<td>Hexagon nut - M3</td>
<td>202 142</td>
</tr>
<tr>
<td>6</td>
<td>Cylinder screw - M3x16 mm</td>
<td>221 074</td>
</tr>
<tr>
<td>7</td>
<td>Screw-in nipple - 1/8&quot;, Ø 6 mm, OR</td>
<td>240 095</td>
</tr>
<tr>
<td>8</td>
<td>Fluidizing pad - 1/8&quot;a</td>
<td>237 264</td>
</tr>
<tr>
<td>9</td>
<td>Gasket (steel version only)</td>
<td>1003 528</td>
</tr>
<tr>
<td>10</td>
<td>Cap screw K-SL - M4x16 mm (steel version only)</td>
<td>216 801</td>
</tr>
<tr>
<td>11</td>
<td>O-Ring - Ø 8,73x1,78 mm (steel version only)</td>
<td>248 428</td>
</tr>
</tbody>
</table>

**Diagram:**

- **Aluminium version**
- **Steel version**
# Manual gun control unit - outside rear wall

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rear wall (aluminum version)</td>
<td>1000 063</td>
</tr>
<tr>
<td>2</td>
<td>Rear wall (steel version)</td>
<td>1004 175</td>
</tr>
<tr>
<td>3</td>
<td>OptiStar CG07 vibrator connection, assembled</td>
<td>1001 177</td>
</tr>
<tr>
<td>4</td>
<td>Milled nut - M6</td>
<td>200 433</td>
</tr>
<tr>
<td>5</td>
<td>Hose connection - complete, Ø 6/4 mm (aluminum version)</td>
<td>1001 520</td>
</tr>
<tr>
<td>6</td>
<td>Hose connection - complete, Ø 6/4 mm (steel version)</td>
<td>1004 184</td>
</tr>
<tr>
<td>7</td>
<td>Hose connection - complete, Ø 8/6 mm (aluminum version)</td>
<td>1001 519</td>
</tr>
<tr>
<td>8</td>
<td>Hose connection - complete, Ø 8/6 mm (steel version)</td>
<td>1004 183</td>
</tr>
<tr>
<td>9</td>
<td>Rectus quick release connection - complete (aluminum version)</td>
<td>1001 517</td>
</tr>
<tr>
<td>10</td>
<td>Rectus quick release connection - complete (steel version)</td>
<td>1004 181</td>
</tr>
<tr>
<td>11</td>
<td>Mains connection CG07</td>
<td>1001 176</td>
</tr>
<tr>
<td>12</td>
<td>Cap screw - M3x8 mm</td>
<td>202 363</td>
</tr>
<tr>
<td>13</td>
<td>Cap screw - M3x12 mm (not shown)</td>
<td>216 747</td>
</tr>
<tr>
<td>14</td>
<td>Shock protection (is fixed on the rear wall, not shown)</td>
<td>1001 058</td>
</tr>
<tr>
<td>15</td>
<td>Fixing screws for shock protection (2 pieces) - M5x12 mm</td>
<td>216 348</td>
</tr>
<tr>
<td>16</td>
<td>Corona/Tribo adapter (not shown)</td>
<td>1001 869</td>
</tr>
<tr>
<td>17</td>
<td>Protection cap for 2.2 Aux connection (not shown)</td>
<td>206 474</td>
</tr>
<tr>
<td>18</td>
<td>Connecting cable (power supply) for 2 control units operation (not shown)</td>
<td>1001 867</td>
</tr>
</tbody>
</table>
Manual gun control unit - outside rear wall

Aluminum version

Steel version

Manual gun control unit - outside rear wall
### OptiStar CG07 Manual gun control unit - housing and power pack

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Housing - CG07 control unit (aluminum version)</td>
<td>1001 435</td>
</tr>
<tr>
<td></td>
<td>Housing - CG07 control unit (steel version, not shown)</td>
<td>1004 200</td>
</tr>
<tr>
<td>2</td>
<td>Power pack - 15 VDC</td>
<td>374 059</td>
</tr>
<tr>
<td>3</td>
<td>Power pack connection cable, assembled</td>
<td>1000 388</td>
</tr>
<tr>
<td>4</td>
<td>Connection cable, assembled</td>
<td>1001 178</td>
</tr>
<tr>
<td>5</td>
<td>Standoff - Ø 4/4,8/4,8 mm, PA</td>
<td>263 508</td>
</tr>
</tbody>
</table>

![Diagram of OptiStar CG07 Manual gun control unit - power pack and housing](image-url)
# OptiStar CG07 Manual gun control unit - front plate

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front plate - complete</td>
<td>1000 395</td>
</tr>
<tr>
<td>2</td>
<td>Front plate with foil keyboard</td>
<td>1000 394</td>
</tr>
<tr>
<td>3</td>
<td>OptiStar mainboard V1.0 - complete, with display</td>
<td>1000 875</td>
</tr>
<tr>
<td>4</td>
<td>Locknut - M3</td>
<td>262 498</td>
</tr>
<tr>
<td>5</td>
<td>Washer - Ø 3,27x0,5 mm</td>
<td>201 944</td>
</tr>
<tr>
<td>6</td>
<td>Standoff - 6x3,4x6,5 mm</td>
<td>1001 925</td>
</tr>
<tr>
<td>7</td>
<td>Standoff - 6x3,4x15,5 mm</td>
<td>1001 926</td>
</tr>
<tr>
<td>8</td>
<td>Compression spring - 0,5x6,3x13,5 mm</td>
<td>230 251</td>
</tr>
<tr>
<td>9</td>
<td>Special screw</td>
<td>1000 400</td>
</tr>
</tbody>
</table>

![Diagram of front plate with parts labeled 1 to 9]