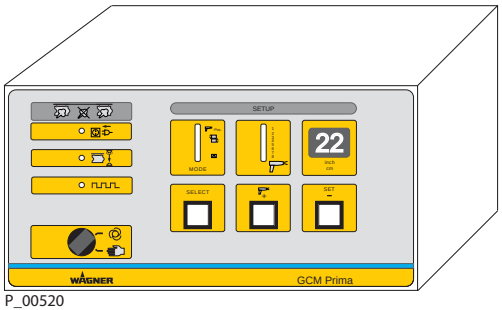
Translation of the original
Operating manual

GCM Prima

Gap control module

Edition 02 / 2008



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CE

Contents

Contents

1 ABOUT THESE INSTRUCTIONS

This operating manual contains information on the operation, repair and maintenance of the unit.
→ Always observe these instructions when operating the unit.
This equipment can be dangerous if it is not operated in accordance with this manual.
Compliance with these instructions constitutes an integral component of the warranty agreement.

1.1 LANGUAGES

The operating manual is available in the following languages:

Language:	Order No.	Language:	Order No.
German	0263961	English	0263962
French	0263963	Dutch	---
Italian	0263964	Spanish	0263965

1.2 WARNINGS, NOTES AND SYMBOLS IN THESE INSTRUCTIONS

Warning instructions in this manual point out particular dangers to users and equipment and state measures for avoiding the hazard. These warning instructions fall into the following categories:

Danger - imminent danger. Non-observance will result in death, serious injury and serious material damage.


SIHI_0100_GB

⚠ DANGER

This line warns of the hazard !
Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.

→ The measures for preventing the hazard and its consequences.

Warning - possible danger. Non-observance can result in death, serious injury and serious material damage.


SIHI_0103_GB

⚠ WARNING

This line warns of the hazard !
Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.

→ The measures for preventing the hazard and its consequences.

Caution - a possibly hazardous situation. Non-observance can result in minor injury.


SIHI_0101_GB

⚠ CAUTION

This line warns of the hazard !
Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.

→ The measures for preventing the hazard and its consequences.

Caution - a possibly hazardous situation. Non-observance can cause material damage.

SIHI_0102_GB **CAUTION**

This line warns of the hazard !
Possible consequences of failing to observe the warning instructions. The signal word points out the hazard level.

→ The measures for preventing the hazard and its consequences.

Note - provide information on particular characteristics and how to proceed.

2 GENERAL SAFETY INSTRUCTIONS

2.1 SAFETY INSTRUCTIONS FOR THE OPERATOR

→ Keep these operating instructions to hand near the unit at all times.
→ Always follow local regulations concerning occupational safety and accident prevention.

2.1.1 ELECTRICAL PLANT AND UNITS

→ To be provided in accordance with the local safety requirements with regard to the operating mode and ambient influences.
→ May only be maintained by skilled electricians.
→ Must be operated in accordance with the safety regulations and electrotechnical regulations.
→ Must be repaired immediately in the event of problems.
→ Must be put out of operation if they pose a hazard.
→ Must be de-energized before work is commenced on active parts.
→ Secure the control unit against being switched back on without authorisation. Inform staff about planned work.
→ Observe electrical safety regulations.

2.1.2 PERSONNEL QUALIFICATIONS

→ Ensure that the unit is operated and repaired only by trained persons.

2.1.3 A SAFE WORK ENVIRONMENT

→ Ensure that the floor of the working area is anti-static (measurement in accordance with EN 1081).
→ Ensure that all persons within the working area wear anti-static shoes.
→ Ensure that gloves that are being worn, are made of conductive material.
→ The powder release must be electronically interlocked with the powder spray system exhaust equipment.
→ Excess coating material (overspray) must be collected up safely.
→ Ensure that there are no ignition sources such as naked flame, glowing wires or hot surfaces in the vicinity. Do not smoke.
→ Maintain sufficient quantities of suitable fire extinguishers and ensure that they are serviceable.
→ The operating company must ensure that an average concentration of powder paint in the air does not exceed 50% of the lower explosion limit (LEL = max. permitted concentration of powder to air). If no reliable LEL value is available, the average concentration may not exceed 10g/m³.

2.2 SAFETY INSTRUCTIONS FOR STAFF

- → Always follow the information in these instructions, particularly the general safety instructions and the warning instructions.
- → Always follow local regulations concerning occupational safety and accident prevention.
- → Under no circumstances should persons with pacemakers be in the area where the high voltage field between the spray gun and the workpiece to be coated builds up!

2.2.1 SAFE HANDLING OF WAGNER POWDER SPRAY UNITS

- → Never point the powder spray gun at people.
- → Before all work on the unit, in the event of work interruptions and functional faults:
  - – Switch off the energy/compressed air supply.
  - – Secure the powder spray gun against actuation.
  - – Relieve the pressure from the powder spray gun and unit.
  - – By functional faults: Identify and correct the problem, proceed as described in chap. "Trouble shooting".

2.2.2 EARTH THE UNIT

The electrostatic charge may, in certain cases, give rise to electrostatic charges on the device. These can involve with unloading transmitting or flame formation.

- → Ensure that the device is grounded before each coating process.
- → Earth the workpieces being painted.
- → Ensure that all persons inside the working area are earthed, e.g. that they are wearing antistatic shoes.
- → Grounding cables must be checked regularly to ensure that they are serviceable (see EN 60204).

2.2.3 PAINT HOSES

- → Only use original Wagner powder hose.

2.2.4 CLEANING

- → De-energize the unit electrically.
- → Disconnect the pneumatic supply line.
- → Relieve the pressure from the unit.
- → Secure the control unit against being switched back on without authorisation.
- → Only mobile industrial vacuum cleaners of design 1 (see ZH 1/487 for C dusts) may be used for getting rid of dust build-ups.

2.2.5 HANDLING POWDER PAINTS

- → Take note of the processing regulations laid down by the manufacturer of the powder paint being used, when preparing or processing the powder.
- → Take note of the manufacturer's advice and the relevant environmental protection regulations when disposing of powder paints.
- → Implement the prescribed safety measures, in particular the wearing of safety glasses and safety clothing as well as the use of protective hand cream.
- → Use dust masks or breathing apparatus.
- → To ensure sufficient protection of health and the environment, only operate the device in a powder booth or at a spray wall with activated ventilation (exhaust air).

2.3 CORRECT USE

WAGNER accepts no liability for any damage arising from incorrect use.

- → Use the unit only to work with the materials recommended by WAGNER.
- → Operate the unit only as an entire unit.
- → Do not deactivate safety equipment.
- → Use only WAGNER original spare parts and accessories.

2.4 SAFETY FEATURES

Plates bearing information for the user have been attached to the work openings of the powder coating booth.
The plate size corresponds to the standard category Ø 100 mm; 3.94 inches.
The label plates, which must be attached, are shown below:

High voltage!
In the control cabinet:
(25 mm; 0.98 inches) voltage before main switch

Danger of crushing!

Explosive atmosphere!

Risk of tripping!

Forbidden for persons with a cardiac pacemaker!

Do not jump on the booth floor!
Danger of slipping

Fire, open light and smoking prohibited!

Forbidden for unauthorized persons!

Wear electrostatically conductive footwear!

Follow the instructions in the operating manual!

3 PRODUCT LIABILITY AND WARRANTY

3.1 IMPORTANT NOTES ON PRODUCT LIABILITY

As a result of an EC regulation, effective as from January 1, 1990, the manufacturer shall only be liable for his product if all parts come from him or are approved by him, and if the devices are properly fitted , operated and maintained.
If other makes of accessory and spare parts are used, the manufacturer's liability could be fully or partially null and void.
The usage of original WAGNER accessories and spare parts guarantees that all safety regulations are observed.

3.2 WARRANTY

This equipment is covered by the following manufacturing warranty
We will at our discretion repair or replace free of charge all parts which within 24 months in single-shift, 12 months in 2-shift or 6 months in 3-shift operation from date of receipt by the Purchaser are found to be wholly or substantially unusable due to causes prior to the sale, in particular faulty design, defective materials or poor workmanship.
The terms of the warranty are met at our discretion by the repair or replacement of the unit or parts thereof. The resulting costs, in particular shipping charges, road tolls, labour and material costs will be borne by us except where these costs are increased due to the subsequent shipment of the unit to a location other than the address of the purchaser.
This warranty does not cover damage caused by:
Unsuitable or improper use, faulty installation or commissioning by the purchaser or a third party, normal wear, negligent handling, defective maintenance, unsuitable coating products, substitute materials and the action of chemical, electrochemical or electrical agents, except when the damage is attributable to us.
This warranty does not cover damage caused by:
Unsuitable or improper use, faulty installation or commissioning by the purchaser or a third party, normal wear, negligent handling, defective maintenance, unsuitable coating products, substitute materials and the action of chemical, electrochemical or electrical agents, except when the damage is attributable to us.
Components not manufactured by Wagner are subject to the warranty terms of the original maker.
The replacement of a part does not extend the warranty period of the unit.
The unit should be inspected immediately upon receipt.
To avoid loss warranty, aniy apparent defect should be notified to us or the dealer in writing within 14 days from date of sale of the unit.
The right to commission warranty services to a third party is reserved.
Warranty claims are subject to proof of purchase by submitting an invoice or delivery note.
If an inspection finds damage not covered by the present warranty, the repair will be carried out at the expense of the purchaser.
Note that this warranty does not in any way restrict legally entitled claims or those contractually agreed to in our general terms and conditions.

J. Wagner AG

3.3 CE-CONFORMITY

Herewith we declare that the supplied version of

- GCM Prima Part No. 0263114

Complies with the following provisons applying to it:

- 94/9/EC (Atex-directive)
- 2004/108/EC (Electro-magnetic compatibility (EMC) guideline)
- 2002/95/EC (RoHs-directive)
- 2002/96/EC (WEEE-directive)

Applied standards, in particular:

- DIN EN 50177
- DIN EN 61241-0
- DIN EN 61241-1
- DIN EN 61000-6-1
- DIN EN 61000-6-2
- DIN EN 61000-6-3
- DIN EN 61000-6-4
- DIN EN 60529
- BGI 764

Identification:

CE

CE Certificate of Conformity
The certificate is enclosed with this product. The certificate of conformity can be reordered from your WAGNER representative, quoting the product and serial number.

Part number:
GCM Prima 0263849

4 DESCRIPTION

4.1 FIELDS OF APPLICATION, USING IN ACCORDANCE WITH THE INSTRUCTIONS

The gap control module GCM Prima is used in the ECOTECH Automatic System to turn off the material delivery in the gaps between the work pieces and the powder supply.

4.2 SCOPE OF DELIVERY

Quantity	Part No.	Description
1	0263114	GCM Prima
The standard equipment includes:		
1	0263849	CE-conformity
1	0263961	Operating manual German
1	See chap. 1.1	Operating manual for the other language

4.3 TECHNICAL DATA GCM PRIMA

Dimensions:	
Height	136 mm; 5.4 inches
Width	270 mm; 10.6 inches
Depth	315 mm; 12.4 inches
Weight	approx. 3.3 kg; 7.3 lb

Electrical:	
Input voltage	18 VDC - 36 VDC
Input power	maxi. 5 W [1)]
Protection class	IP 54

Inputs (Light barrier, clock A, clock B):	
Input voltage	18 VDC - 36 VDC
Input current	maxi. 4 mA
Input frequency (light barrier)	maxi. 100 Hz
Input frequency (clock A, clock B)	maxi. 200 Hz
Measurements	
Number of guns	maxi. 8 pieces
Resolution, Repetitive accuracymin	min. 1 cm; 0.39 inches [2) 3)]
Smallest detectable gap	10 cm; 3.94 inches
Maximum distance	20 m; 65.6 ft [4)]
Run-up and run-out	-99 cm - + 99 cm; -38.98 inch - +38.98 inch

Ambient conditions:	
Working temperature range	5-45°C; 41-113°F

1) Without conveyor clock generator, light barrier and gun enabling.
2) The unit of measurement depends on the length of the calibration work piece (see chap. 4.6).
3) Will only be achieved with a sufficiently fine resolution of the conveyor clock generator.
4) The maximum permissible travel of the work pieces between light barrier and the last gun.

4.4 FUNCTION

The gap control switches off the material conveying and the high voltage to the spray guns in the gaps between the work pieces. This keeps the circuit powder factor low in coating systems with cycle operation and reduces the wear on the powder spray guns. The gaps between the work pieces are recognized by a light barrier or light curtain at the entrance to the booth. Normally, the conveyor speed and the conveying direction are recorded by the conveyor pulse generator (incremental encoder).
Fore-run and after-run can be adjusted at the gap control to ensure optimum coating of the work piece edges.

Note:

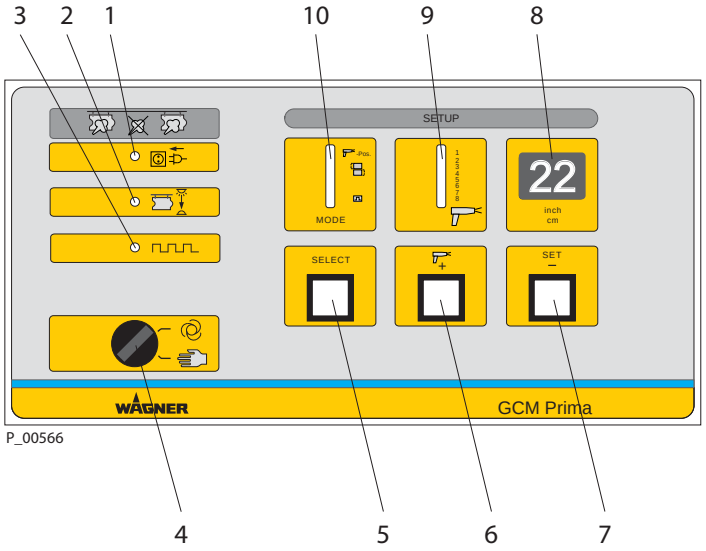
The gap control GCM Prima is able to produce an internal conveyor clock signal.

Advantages:

- Production can continue with reduced accuracy if an external conveyor pulse genera tor is faulty.
- You can work without a conveyor pulse generator if the conveyer speed remains constant.

4.5 OPERATING CONTROLS

4.5.1 OPERATING ELEMENTS FRONT SIDE GCM PRIMA



1 Power indicator
- Lights up when gap control is turned on

2 Indicator „Light barrier“
- Indicates light barrier signal

3 Indicator „Conveyor clock“
- Indicates conveyor clock signal

4 Selector switch „ Hand/ Automatic“
- Hand
  The gap control GCM Prima controls each gun individually
- Automatic
  All guns are switched on when gun enable signal is given
  (The GCM Prima has no effect)

5 Push button „Select“
- To select the various programming modes
- Programming the gun position
- Adjusting the run up
- Adjusting the run out
- Internal clock ON / OFF

6 Push button „Gun+“
Selecting the gun
Increasing the run up
Increasing the run out

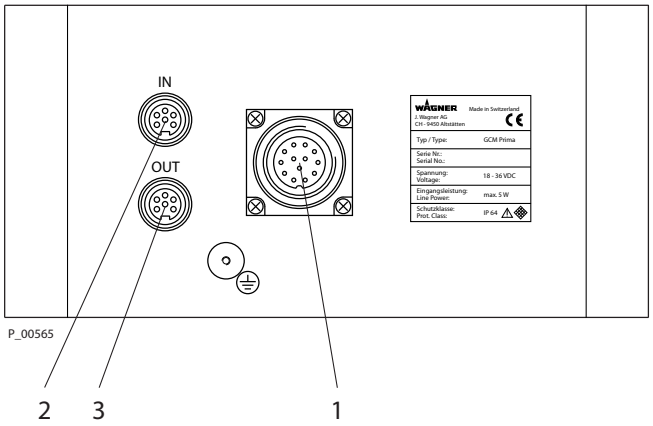
7 Push button „Set-“
Setting the gun position or the gun steady state condition
Reducing the run up
Reducing the run out
Turning the internal clock generator ON / OFF

8 Illuminated display
- Display for programming
- Conveyor direction
- Gun position
- Run-up - run-out distance in cm; inch
- Indicator, internal timing on/ off

9 Bar graph LED display
- Operating mode
  Display of the active functions
- Programming mode
  Indicates which gun position is being programmed

10 Bar graph LED display „Mode“
- Operating mode
  Display of the active functions
- Programming mode
  Display of the programming mode
  (display flashes)

4.5.2 CONNECTIONS ON THE REAR SIDE OF THE GCM PRIMA



1 Connection to CCM Prima / SCM Prima

2 Connection to the connection box GCM Prima

3 Connection 2. GCM Prima

4.6 OVERVIEW OF THE GCM PRIMA COMPONENTS

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Connection box (1)

The connection box serves as distributor for the clock generator and light barrier or light curtain and is connected to the gap control module.

Connection box with cable connector and 10 m; 32.81 ft cable	Part No. 0263254
Cable connector (included in the connection box)	Part No. 9955242


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Clock generator (2)

The clock generator synchronizes the powder coating system with the conveyor system.

Clock generator with 14 pulses per rotation, length of cable 1 m; 3.28 ft	Part No. 3110923
Clock generator with 100 pulses per rotation, length of cable 1 m; 3.28 ft	Part No. 9955239

Clock generator with higher revolutions upon request.

Holder (2)

Holds the conveyor clock generator.

Holder incl. coupling for conveyor clock generator	Part No. 3104680


P_00569

Light barrier (3)

The light barrier recognizes the work pieces at the entry of the booth.
The light barrier is suited for parts with large sur-faces or vertical hanging profiles. For horizontal profiles or frames, the light barrier is **not suited**.

Light barrier with length of cable 4 m; 13.12 ft consisting of emitter and receiver	Part No. 3113707


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Extension cables (4)

To the light barrier, clock generator and connection box

Length 10 m; 32.81 ft Part No. 0263252


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Transition cable (5)
(light curtain signal)
Connection cable to transmit the light curtain signal to the connection box

Length 0.3 m; 0.98 ft Part No. 0360246


P_00127

Connection cable (6) (light curtain signal)

Connection cable between light curtain, Y-distributor and to the transition cable

0.5 m; 1.64 ft Part No. 3148831
2.0 m; 6.56 ft Part No. 3148832
5.0 m; 16.40 ft Part No. 3148833
10.0 m; 32.81 ft Part No. 3148834


P_00126

Y-distributor (7) (light curtain signal)

Y-distributor the light curtain signal Part No. 3148835


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Light curtain Type SCAN (7)
Resolution = 3 cm; 1.18 inch

450 mm; 17.72 inch Part No. 3148826
1200 mm; 47.24 inch Part No. 3148827
1650 mm; 64.96 inch Part No. 3148828
2025 mm; 79.72 inch Part No. 3148829
2400 mm; 94.49 inch Part No. 3148830


P_00256

Connection cable GCM/CCM (9)

Connection cable between the GCM Prima and the CCM Prima

Length 1.4 m; 4.59 ft Part No. 0263241


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Connection cable GCM/GCM (10)

Connection cable between the first GCM Prima and the second GCM Prima

Length 1.2 m; 3.94 ft Part No. 0263253

Calibration work piece (11)

Metric calibration work piece Part No. 0263255
Steel sheet (coated) 30 x 70 cm

Inch calibration work piece Part No. 0263256
Steel sheet (coated) 11.81 x 70 inch

5 PREPARATIONS FOR STARTING UP

⚠ WARNING

Incorrect installation/operation!
Risk of injury and damage to equipment

→ When putting into operation and for all work, read and follow the operating instructions and safety regulations for the additionally required system components.

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5.1 POSITIONING OF THE UNIT

⚠ DANGER

Incorrect installation of the unit!
Danger to life and equipment damage

→ Locate the control unit outside the spray booth and/or outside the danger area.
Security is guaranteed if it is built into the rack.
→ Protect the control unit from extreme temperature and moisture changes. Protect the control unit against dirt.
→ Lay and fix the connecting cable correctly.

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5.2 CONNECTION OF A LIGHT CURTAIN OR A LIGHT BARRIER

⚠WARNING

Wrong installation of the light barrier/light curtain!
Risk of explosion and equipment damage

→ The light barrier or light curtain must be located or installed outside the danger area.
→ Observe installation guidelines for electrical material in areas at risk from explosion!

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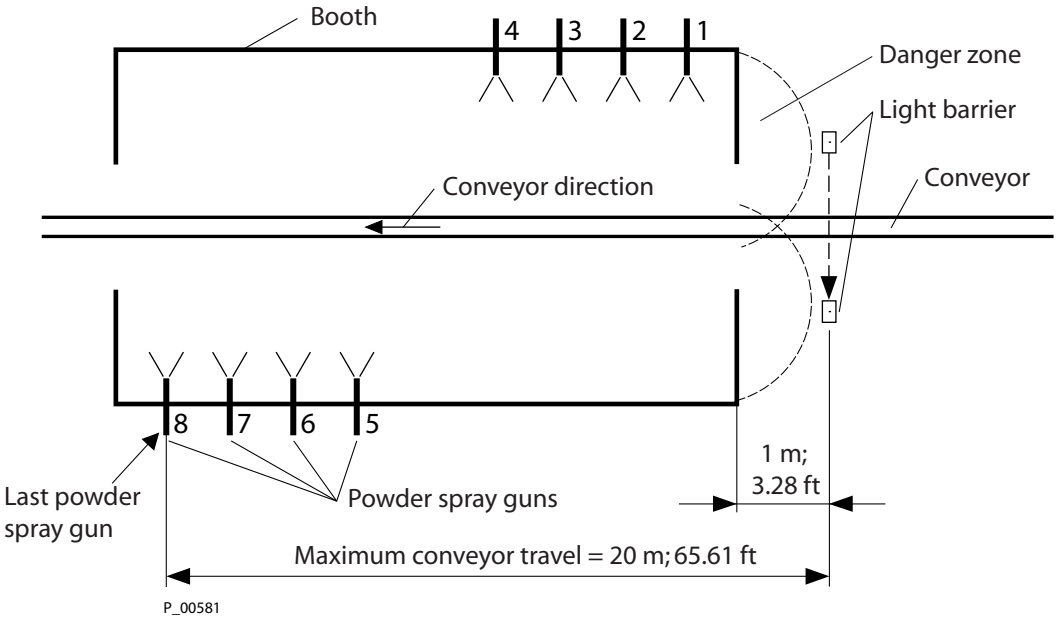
Note:
The conveying distance from the light barrier to the last powder spray gun, may not be longer than 20 m; 65.61 ft.



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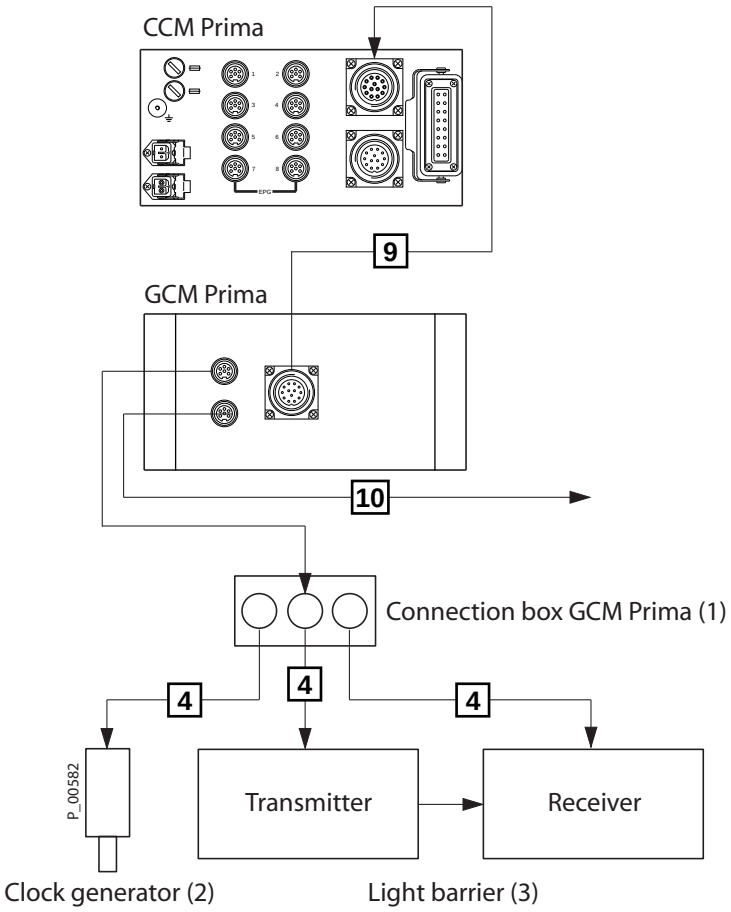
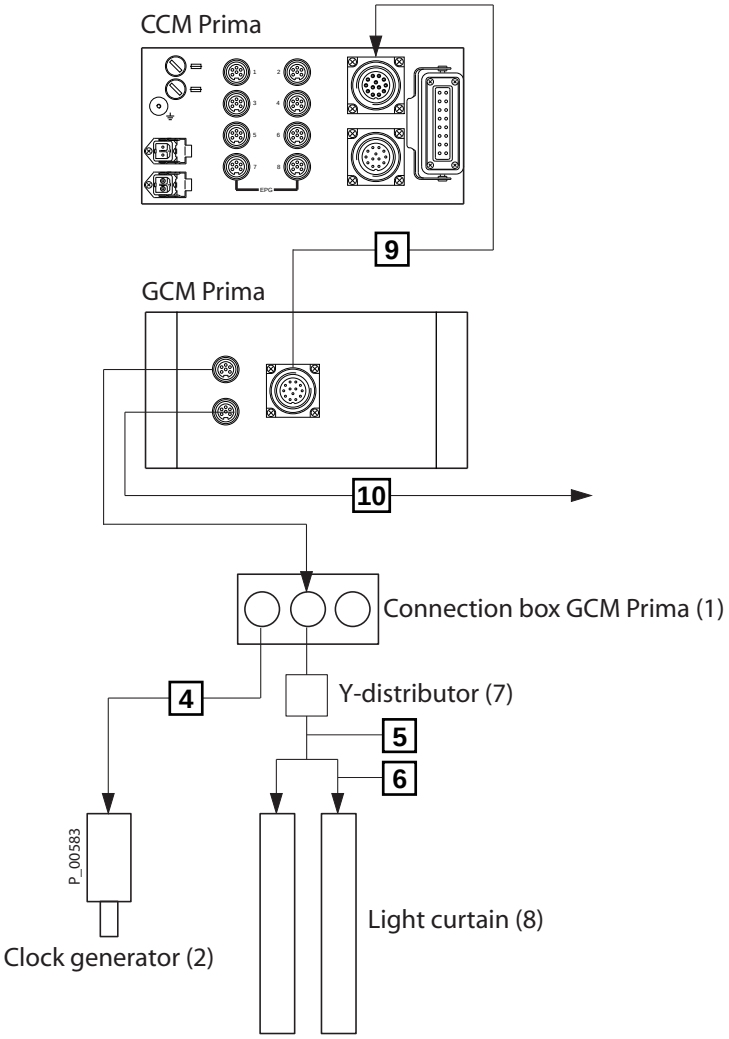
Note:
It does not matter, whether the interrupted light barrier emits a signal with +24 VDC or 0 V. The light barrier logic is automatically recognized by the gap control and is taken into consideration during operation.

5.3 CONNECTION WITH AN EXTERNAL CONVEYOR CLOCK GENERATOR

5.3.1 CONNECTION DIAGRAM LIGHT BARRIER

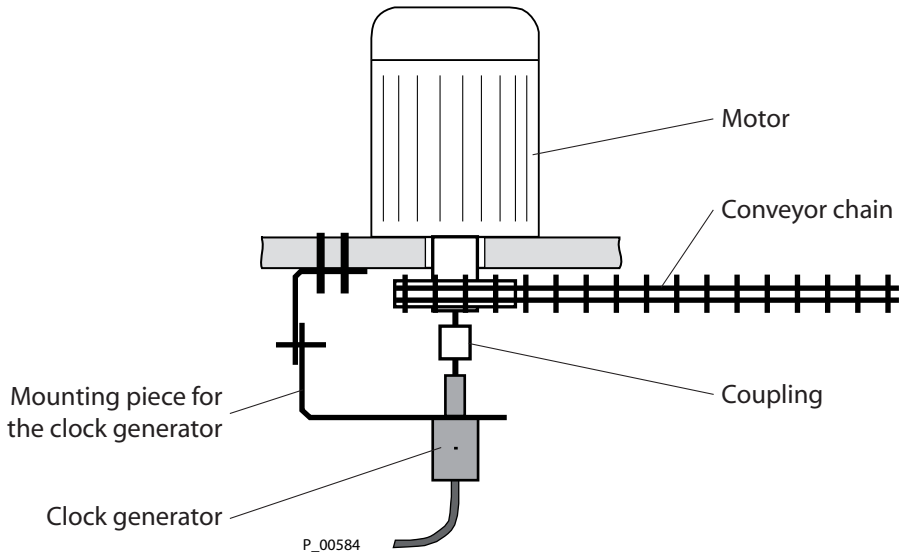


5.3.2 CONNECTION DIAGRAM LIGHT CURTAIN



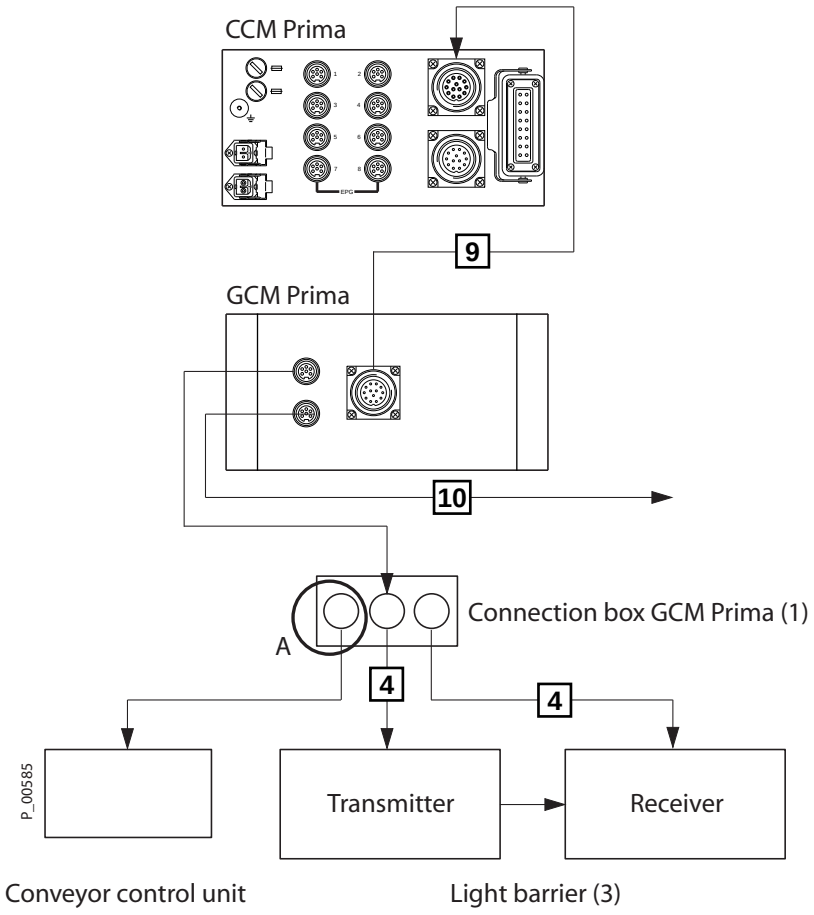
Note:
How to select the suitable conveyor clock generator resolution is described in chapter 10 „Attaches“.

The conveyor clock generator is best installed on the mount (part no. 3104680, see chap. 4.6) and connected via a coupling to the motor shaft.



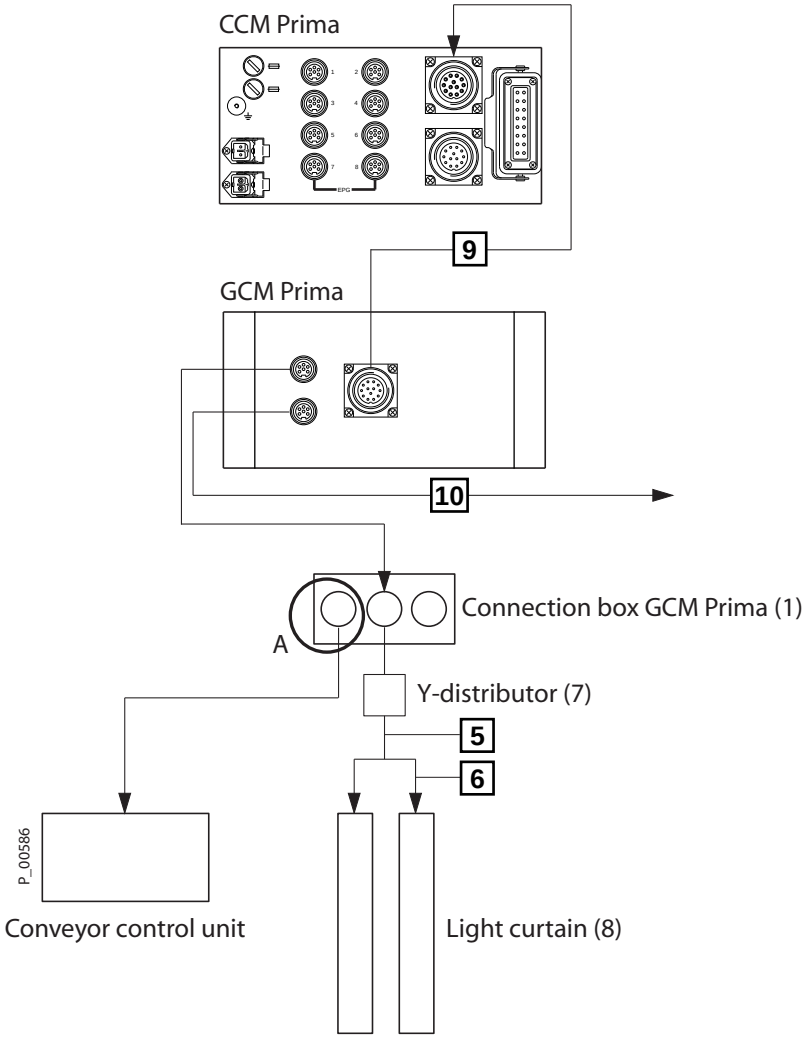
5.4 CONNECTION WITH THE INTERNAL CONVEYOR CLOCK GENERATOR

5.4.1 CONNECTION DIAGRAM LIGHT BARRIER



Detail A, see chapter 5.4.3 „Pin assignment for the connector box“.

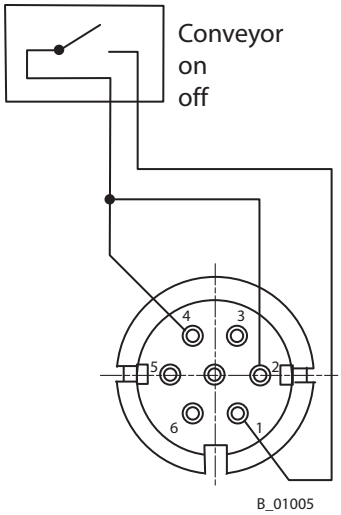
5.4.2 CONNECTION DIAGRAM LIGHT CURTAIN



Detail A, see chapter 5.4.3 „Pin assignment for the connector box“.

5.4.3 PIN ASSIGNMENT FOR THE CONNECTOR BOX

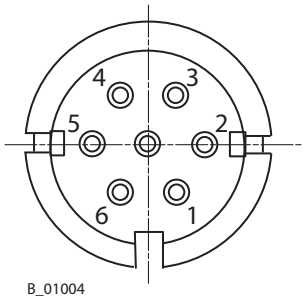
Cable connector - Conveyor clock generator



View of the soldered connection points of the plug pins

Pin	Signal
1	+24 VDC
2	Input clock A
3	Not used
4	Input clock B
5	Not used
6	Earthing
7	Not used

Cable connector - Light barrier



View of the soldered connection points of the plug pins

Pin	Signal
1	+24 VDC
2	Not used
3	Earthing
4	Not used
5	Input light barrier
6	+24 VDC
7	Not used

Note:
The pin assignment on both light barrier sockets is identical.

5.5 EARTHING

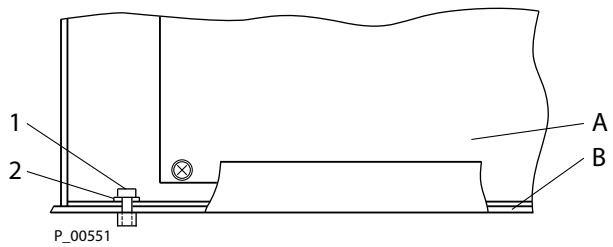
It is important for system security and to achieve an optimum coating, that all system components such as work pieces, conveyors, control unit, color supply, control unit and booth or spray wall are perfectly grounded.

The imperfect earthing of a work piece will result in:
- Dangerous electric charging of the work piece
- Very poor wrap-around
- Uneven coating
- Back spraying to the spray gun, i.e. contamination.

The prerequisites for perfect earthing and coating are:
- Conducting suspension for the work piece that is to be coated
- Grounding of the powder coating booth, transport and suspension equipment to be provided on site, in accordance with the corresponding Operating manuals or the definitions laid down by the manufacturer
- Regular cleaning of hangers from powder residues
- A grounding resistance for the work piece of a maximum of 1MΩ (mega ohm)
- Grounding cable connected to the controller module or control cabinet.

If hooks or other hanger parts do not have all the paint removed, ignitable sparks can occur between work piece and hangers. These sparks can cause strong radio frequency interferences.

5.5.1 EARTHING OF THE GCM PRIMA



Note:

There must be a star washer 2 between the screw head 1, the control units A and the rack B or module supports B. On tightening the screw 1, the paint at this point will be removed, so ensuring a good grounding.

- Connect the control units A by the fastening screw 1 with star washers 2 to the rack B resp. module supports B, ensuring that the connection is electrically conductive.

6 STARTING WORK AND PROGRAMMING

⚠ WARNING

Incorrect installation/operation!
Risk of injury and damage to equipment

→ When putting into operation and for all work, read and follow the operating instructions and safety regulations for the additionally required system components.

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⚠ DANGER

High voltage field!
Danger to life from malfunctioning heart pacemakers

Ensure that persons with heart pacemakers:
→ Do not work with the electrostatic spray gun.
→ Remain outside the area of the electrostatic spray gun/workpiece.

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6.1 STARTING WORK WITH EXTERNAL CONVEYOR CLOCK GENERATOR

Check and correct the conveyor direction:

The gap control GCM Prima automatically recognizes the conveyor direction, if the external conveyor clock generator sends two pulses. Wagner conveyor clock generators meet this requirement. If the conveyor direction is not correctly recognized, a press on the button corrects it.

Proceed as follows to display the software version and the conveyor direction.

Work procedures:

1. Switch off the master switch on the CCM Prima.
2. Press button (5) „Select" and hold button on the GCM Prima.
3. Switch on the master switch on the CCM Prima.
   The software version (at present 1.0) will be displayed as long as button (5) „Select" is pressed.
4. Release Button (5) „Select".
5. Start the conveyor in the forward direction.
   Display 3, conveyor clock frequency flashes.
   Display 8 Shows Fo (forwards) or bA (backwards).
6. Should the display not correspond to the conveyor direction, press the button (7) „Set-" to correctly display the conveyor direction.
7. Press the button (5) „Select".
   The system will change from Programming mode to Operating mode. The active functions are displayed. The active functions are shown in display 10 "Mode". In factory settings, no functions are active.

Note:

If no button is pressed during start up, the gap control GCM Prima switches directly to Operation mode.

After checking and if necessary adjusting the conveyor direction, the gun positions will have to be programmed.

A change to the conveying direction can also be made in the connection box, by someone trained to do such work.

Description	Display
Display software version	1.0
Conveyor direction forward	Fo
Conveyor direction backward	bA

6.2 STARTING WORK WITH INTERNAL CONVEYOR CLOCK GENERATOR

Note:
In factory settings, the gap control GCM Prima is set to operate with an external con-veyor clock generator. To operate with the internal conveyor clock generator, the gap control GCM Prima must first be switched to the internal conveyor clock generator.

Work procedure:

1. Switch on the master switch on the CCM Prima.
   The operating display 1 lights up at the GCM Prima.
2. Turn selector 4 to position "Manual".
3. Push button (5) „Select" for 5 to 10 secs. until the „Run-up" display mode is flashing
4. Press button (5) „Select" twice.
   Display (10) „Mode" will flash.
5. Push button (5) „Select" and button (6) „Gun+" simultaneously.
   Display (10) „Mode" will flash and show the setting of the „internal clock generator".

Description	Mode	Display
Internal conveyor clock switched off	 B_01013	– –
Internal conveyor clock switched on	 B_01013	on

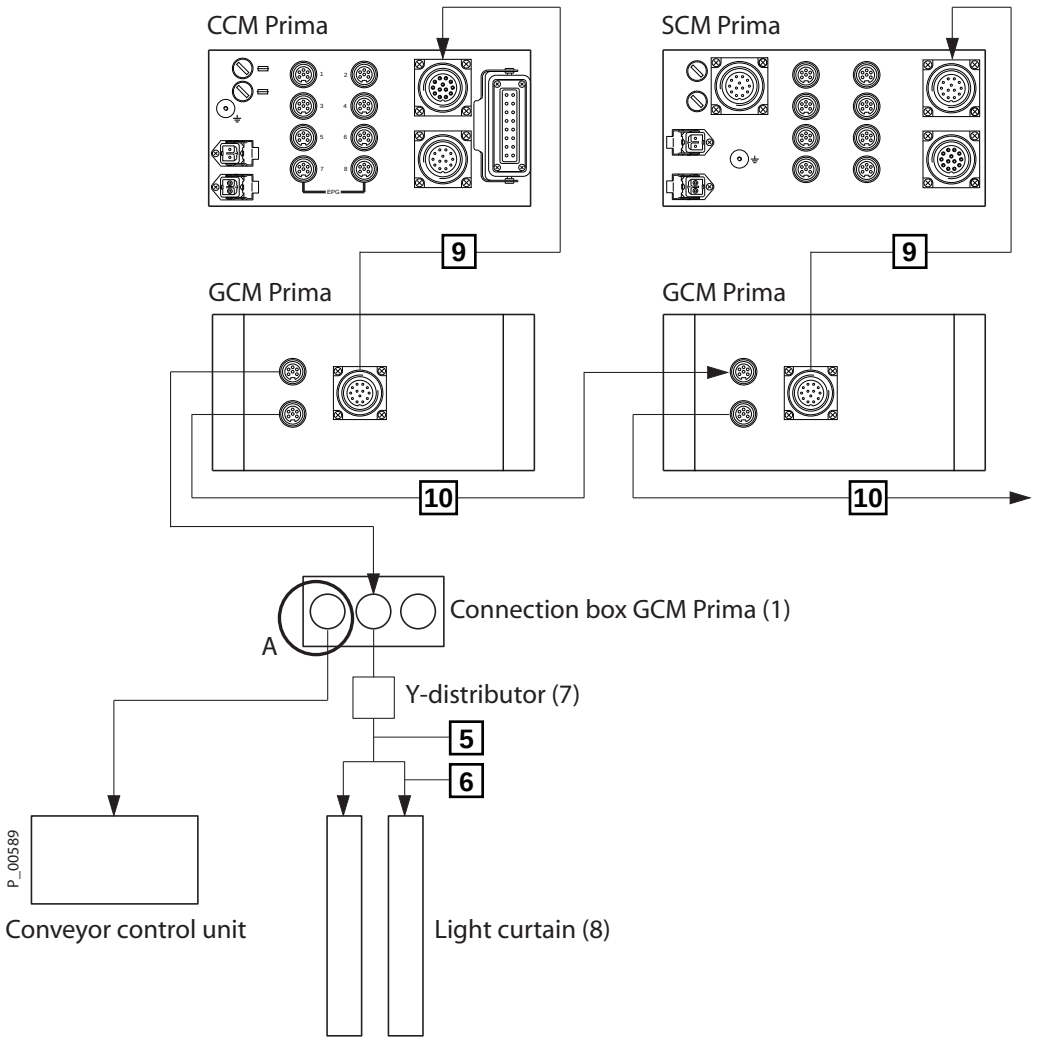
6. Press the button (7) „Set-" to toggle between the internal and external conveyor clock generators.
7. Hold button (5) „Select" pressed for 5 - 10 sec. until the system has switched back to the working mode.
   The active functions are indicated in the displays.

Note:
After switching to the internal conveyor clock generator the gun positions have to be programmed for this operating mode.

6.3 START UP WITH AN ADDITIONAL GAP CONTROL GCM PRIMA

For systems with more than eight guns, an additional gap control GCM Prima is required for each group of eight additional eight guns.

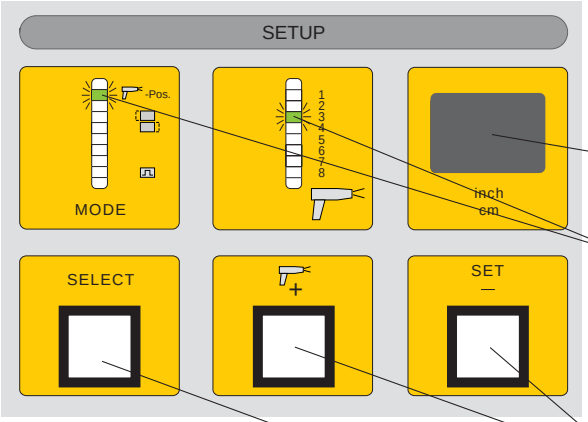
These additional guns can be controlled by the conveyor clock generator and the light barrier of the first gap control GCM Prima.



Detail A, see chapter 5.4.3 „Pin assignment for the connector box“.

6.4 PROGRAMMING

Note:
Successful programming is only possible if the conveying direction is correct.
During coating operations, the programming mode is not accessible! Data of the work pieces would be lost. Work pieces, which have already passed the light barrier, would be affected.



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The display depends on the programming mode.

Flashing LED

The button assignments depend on the programming mode.

To return to „Operation“ mode, press the button until the bar graph stops flashing (approx. 5 sec).

Press the button to select the desired programming mode.

6.4.1 RESETTING THE GAP CONTROL TO FACTORY SETTINGS

The gap control GCM Prima can be reset to factory settings at any time. During this process, all application points and other settings are deleted.

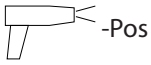
We recommend that you reset the gap control if the programming fails.

Description	Mode	Display
Guns 1 to 8 are always switched off	 -Pos	– –
No Run-up set		
No Run-out set		
Internal conveyor clock switched off		– –

Work procedure:

1. With the system switched on press buttons „Select“, „Gun+“ and „Set-“ simultaneously.
   All displays will light up for about two seconds and then switch off.
   All settings are deleted.

6.4.2 PROGRAMMING THE GUN POSITIONS (FOR CM OR INCH)



Before the first start up all gun positions have to be defined. Later on individual gun position settings can be changed in a special programming mode. In this programming mode individual guns can also be switched ON or OFF permanently.

Note:
The gun positions are always programmed by means of the calibration work piece, because at the same time the gap control GCM Prima is calibrated to the conveyor.

The type of the calibration work piece defines the unit of measurement for which the gap control GCM Prima is calibrated.

Length of calibration work piece 70 cm **the GCM Prima works in cm**
Length of calibration work piece 70 inch **the GCM Prima works in inches**

Work procedure:

1. Press button 5 "Select" to change to programming mode.
2. Check: The light barrier must be free!
3. Press button 5 "Select" and button 6 "Gun+" at the same time. The unit changes to "Gun position" mode.
4. Hang the calibration work piece on the hanger in front of the light barrier and move the front edge of the calibration work piece to the first gun position. Make sure that during this process, the light barrier only scans the calibration work piece. Protruding hanger parts may not be scanned by the light barrier, as the calibration would then be erroneous.

Description	Mode	Display
Gun always switched off	-Pos	– –
Gun always switched on	-Pos	on
A gun position is already programmed	-Pos	Pr
The gun position is newly programmed	-Pos	nP

5. Press the button (6) „Gun+" (possibly several times) to select the guns to be programmed.
6. Press button (7) „Set-" to save the gun position moved to in the gap control GCM Prima (nP). Several presses the button (7) „Set-" on enable defining the permanent gun status (see table).

7. Move to the next gun position and repeat the operation sequence 5 and 6.
8. When the adjustment process is complete, press button 5 "Select" for 5 – 10 seconds to return to operating mode.

Note:
Before exiting the programming mode the calibration work piece must have passed completely the light barrier!

7 OPERATION

⚠ WARNING

Incorrect installation/operation!
Risk of injury and damage to equipment

→ When putting into operation and for all work, read and follow the operating instructions and safety regulations for the additionally required system components.

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⚠ DANGER

High voltage field!
Danger to life from malfunctioning heart pacemakers

Ensure that persons with heart pacemakers:
→ Do not work with the electrostatic spray gun.
→ Remain outside the area of the electrostatic spray gun/workpiece.

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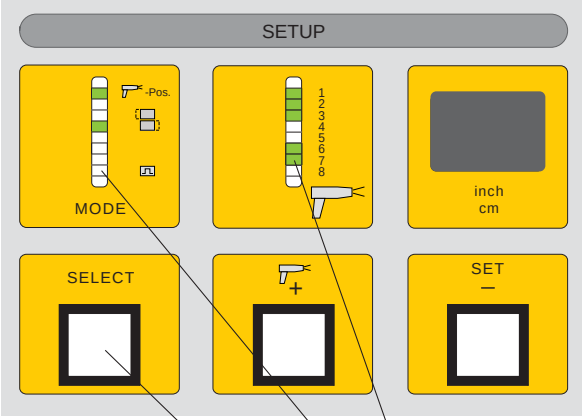
7.1 OPERATION

After starting the gap control GCM Prima, it is operational with the current settings Even after a power interruption, the current settings are maintained.

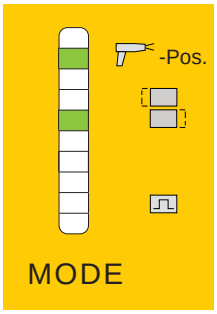
Note:
The data of work pieces, which have already passed the light barrier, are lost when a power failure occurs.



Indicates which gun is switched on.

Display of the active functions (no flashing).

Press (approx. 5 seconds) until the display "Fore run" flashes, to change to the "Programming" mode. The GCM Prima gap control is now in programming mode.



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An At least one gun position is defined

Fore run is not set
After run is set

Internal conveyor clock is deactivated.

7.2 ADJUSTING THE FORE RUN AND THE AFTER RUN

All guns must first have been activated if you need to adjust the fore run or after run times during coating operation.

Work procedure:

1. Set selector 4 "Manual/automatic" to the "Manual" position.
2. Press button 5 "Select" to change to programming mode.
3. Make changes to the fore-run and after-run. (see chap. 7.2.1 and 7.2.2).
4. Press button 5 "Select" to change to operating mode.
5. Leave selector 4 "Manual/Automatic" in the "Manual" position during a conveying run that is longer than the length of a booth.
6. Set selector 4 "Manual/automatic" to the "Automatic" position.
   Gap control now works with the new settings.

7.2.1 ADJUSTING THE FORE RUN

With the adjustable fore run, optimal coating results of front edges of work pieces are achieved. With the fore run set, the spray gun switches on at the programmed distance in front of the work piece. The fore run can be set between -99 cm; -38.98 inches up to +99 cm; +38.98 inches (determined by the length of the calibration work piece) in single steps. If the conveyor clock generator resolution is too low, the gap control GCM Prima adjusts the step values automatically.

The programmed fore run is valid for all eight guns.

Work procedure:

1. Press button 5 "Select" to change to the programming mode "Fore run".
2. Change the fore run to the required value by pressing button 6 "Gun+" or button 7 "Set-".
3. Quit "Fore run" programming mode by pressing button 5 "Select":
   Press and release -> Change to "After run" programming mode
   Press and hold (5 – 10 seconds) -> Return to "Operation" mode
   Pressing buttons 5 "Select" and 6 "Gun+"" together
   -> Change to "Gun position" mode.

7.2.2 ADJUSTING THE AFTER RUN

With the adjustable after run, optimal coating results of the rear edges of work pieces are achieved. With the after run set, the spray gun switches off at the programmed distance behind the work piece. The after run can be set between -99 cm; -38.98 inches up to +99 cm; +38.98 inches (determined by the length of the calibration work piece) in single steps. If the conveyor clock generator resolution is too low, the gap control GCM Prima adjusts the step values automatically.

The programmed after run is valid for all eight guns.

Work procedure:

1. Press button 5 "Select" to change to the programming mode "After run".
2. Change the after-run to the required value by pressing button 6 "Gun+" or button 7 "Set-".
3. Quit "After run" programming mode by pressing button 5 "Select".

7.3 SWITCHING THE INTERNAL CONVEYOR CLOCK ON/ OFF

The gap control GCM Prima can generate an internal conveyor clock, which brings the following advantages:

- If the external conveyor clock generator is defective production can continue with only a slight loss of precision ease.
- You can work without a conveyor pulse generator if the conveyer speed remains constant.

These are the disadvantages of an internal conveyor clock generator compared with an external one:

- At every change of the conveyor speed, the gun positions have to be reprogrammed.
- The direction of the conveyor can no longer be determined.

Programming mode „internal conveyor clock“ is only required during start up or if the conveyor clock generator is defective. Also, additional process steps are required during reprogramming. For these reasons, programming mode is accessible by pressing the„Select“ and„Gun+“ button combination.

Preparations:

Change from external to internal pulse generator:

- Connection of the gap control GCM 2007 in accordance with chapter 5.4.„Connection with the internal conveyor clock generator“.

Change from internal to an external conveyor pulse generator:

- Connection of the gap control GCM 2007 in accordance with chapter 5.3.„Connection with an external conveyor clock generator“.
- Adjustment of the conveying direction, also refer to chapter 6.1 „Starting work with external conveyor clock generator“.

Work procedure:

1. Press button 5 “Select” to change to the programming mode “Internal conveyor pulse generator”.
2. Switch between internal and external conveyor pulse by pressing button 5 “Select”.
3. Quit “Internal conveyor pulse generator” programming mode by pressing button 5 “Select”.
   Press and release -> Change to “Fore run” programming mode.
   Press and hold (5 – 10 seconds) -> Return to “Operation” mode.

Note:
The gun positions must be reprogrammed after every change between internal and external conveyor pulse. See chapter 6.4.2 “Programming gun positions”.

8 ELIMINATION OF FAULTS

⚠ DANGER

Incorrect maintenance/repair!
Danger to life and equipment damage

→ Maintenance, repairs or the exchange of units or parts there of must be carried out by trained personnel, outside the danger areas.

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Fault	Cause	Rectification
Power indicator does not light up	• CCM Prima is not switched on • Cable GCM-CCM is not plugged in	• Turn on CCM Prima • Insert cable GCM-CCM
All guns remain switched off	• No gun position programmed • No gun enabling through CCM Prima • Work pieces not registered • No conveyor clock signal present	• Program gun positions • Check gun enabling • Connect light barrier • Connect external conveyor clock generator or activate internal clock generator
Individual guns do not turn on	• Gun position is not programmed • Control unit EPG Prima turned off	• New programming of the gun position • Turn on control unit EPG Prima
All guns remain switched on	• Selector switch is turned to „hand“ • Guns are wrongly or not programmed	• Turn selector switch to „automatic“ • New programming of the gun position
The guns turn on in the gap and turn off in the work piece area	• During switching to the programming mode„gun“ the light barrier was not free	• Change to the programming mode -“gun“ and run the calibration work piece compl. through the light barrier. Return to mode„Working“.
The set fore run and after run values we do not correspond to the run up and run out in operation.	• The length of the calibration work piece was scanned in-correctly, e.g.: by the calibration work piece swaying or by scanning protruding hangers.	• New programming of the gun position
Fore run and after run cannot be adjusted in steps of on unit	• Resolution of the conveyor clock generator too low (>1 cm /pulse)	• Use conveyor clock generator with higher resolution

Fault	Cause	Rectification
Small work pieces are not registered	• The light barrier is not sensitive enough • Negative fore run or after run too great	• Align the light barrier more precisely or replace by a more sensitive light barrier • Reduce negative fore run or after run
The gun are not turned off in small gaps	• Too small gaps • Negative fore run or after run too great	• Increase gap to: (>10 cm resp. 10 inch) • Reduce pre-trigger resp. back lash

9 SPARE PARTS

9.1 HOW TO ORDER SPARE PARTS

Always supply the following information to ensure delivery of the right spare part:

Part Number, description and quantity

The quantity need not be the same as the number given in the „Quantity“ column. This number merely indicates how many of the respective parts are used in each subassembly.

The following information is also required to ensure smooth processing of your order:

- Address for the invoice
- Address for delivery
- Name of the person to be contacted in the event of any queries
- Type of delivery required (air freight or mail, sea route or overland route, etc.)

Marks in spare parts lists

Note to column „K“ in the following spare parts lists.

◆ = Wearing parts
Note: No liability is assumed for wearing parts

● = Not part of standard equipment, available, however, as additional extra.

	**⚠WARNING** **Incorrect maintenance/ repair!** Risk of injury and damage to equipment → Repairs and part replacement may only be carried out by specially trained staff or a WAGNER service center. → Before all work on the system and in the event of work interruptions: - Switch off the energy/compressed air supply. - Ensure that all system components are grounded. - Secure the control unit against being switched back on without authorisation. → Observe the operating and service instructions when carrying out all work.

9.2 CONTROL UNIT GCM PRIMA

Pos	K	Qty	Part No.	Description
			0263114	Control unit GCM Prima
			9998261	Spacer pin
			9922101	Serrated washer A4.3

10 ATTACHES

10.1 SELECTION OF THE CORRECT CONVEYOR CLOCK GENERATOR RESOLUTION

The resolution of the conveyor clock generator is determined by two factors:

1. At too coarse a resolution the precision of the gap control GCM Prima can not be used completely because the conveyor clock generator will delivers less than 1 pulse per cm; inch.
2. At a too fine resolution the conveyor clock generator delivers many impulses for a relatively short conveyor travel. At high conveyor speeds too many conveyor clock impulses are generated, and cannot be analysed by the gap control GCM Prima.

The following guidelines and calculating examples should help for determining the optimum conveyor clock generator resolution.

Guidelines:
The figures listed in the table below for the conveyor runs and speed are to be determined and converted into the dimensional units stated there.

Description	Gap control calibrated in cm	Gap control calibrated in inches
The distance covered by the conveyor in one revolution of the conveyor clock generator	$s_{Conveyor}$ = ... m	$s_{Conveyor}$ = ... ft
Maximum planned conveyor speed	$v_{Conveyor}$ = ... m/min	$v_{Conveyor}$ = ... ft/min

Dimensional units:
m = Metres
cm = Centimetres
m/min = Metres per minute
Imp/U = Pulses per revolution
inch = Inches
ft = Feet
ft/min = Feet per minute

Calculation of the coarsest conveyor clock resolution A_{lowest}

GCM Prima calibrated in :	Calculation formula
cm	$A_{lowest} = 100 \times s_{Conveyor}$ (in m) = ... Pulses/rev
inches	$A_{lowest} = 12 \times s_{Conveyor}$ (in ft) = ... Pulses/rev

Calculation of the finest conveyor clock resolution $A_{highest}$

GCM Prima calibrated in :		Calculation formula
cm	$A_{highest} = 12000$	$\frac{s_{Conveyor}\text{ (in m)}}{v_{Conveyor}\text{ (in m/min)}}$ = ... Pulses/rev
inch	$A_{highest} = 12000$	$\frac{s_{Conveyor}\text{ (in ft)}}{v_{Conveyor}\text{ (in ft/min)}}$ = ... Pulses/rev

Note:
The chosen conveyor clock generator resolution must be lower than the calculated finest resolution A_{lowest} and higher than the calculated coarsest resolution $A_{highest}$.
If two or more conveyor clock generator resolutions lie between the two calculated values the coarsest resolution is to be selected.

1. Example of calculation:
(GCM Prima calibrated in cm)

$s_{Conveyor} = 0.8$ m $\quad v_{Conveyor} = 10$ m/min

$A_{lowest} = 100\ s_{Conveyor}$ in m

$A_{lowest} = 100 \times 0.8 = 80$ Pulses/rev

$A_{highest} = 12000 \quad \frac{s_{Conveyor}\text{ (in m)}}{v_{Conveyor}\text{ (in m/min)}}$ = ... Pulses/rev

$A_{highest} = 12000 \quad \frac{0.8}{10} = 960$ Pulses/rev

Possible conveyor clock generator resolution: 100 Pulses/rev (see chap. 4.6)

Selection:
Conveyor clock generator resolution = 100 Pulses/rev

2. Example of calculation:
(GCM Prima calibrated in inches)

$s_{Conveyor} = 2.5$ ft $v_{Conveyor} = 30$ft/min

$A_{lowest} = 12\ s_{Conveyor}$ in ft

$A_{lowest} = 12 \times 2.5 = 30$ Pulses/rev

$$A_{highest} = 12000 \quad \frac{s_{Conveyor}\ (\text{in ft})}{v_{Conveyor}(\text{in ft/min})} = \ldots\ldots\ldots \text{Pulses/rev}$$

$$A_{highest} = 12000 \quad \frac{2.5}{30} = 1000 \text{ Pulses/rev}$$

Possible conveyor clock generator resolution 100 Pulses/rev (see chap. 4.6)

Selection:
Conveyor clock generator resolution = 100 Pulses/rev

3. Example of calculation:
(GCM Prima calibrated in cm)

$s_{Conveyor} = 15$ cm $= 0.15$ m $v_{Conveyor} = 20$ m/min

$A_{lowest} = 100\ s_{Conveyor}$ in m

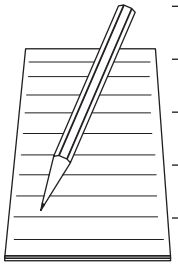
$A_{lowest} = 100 \times 0.15 = 15$ Pulses/rev

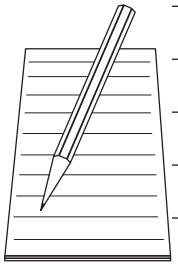
$$A_{highest} = 12000 \quad \frac{s_{Conveyor}\ (\text{in m})}{v_{Conveyor}(\text{in m/min})} = \ldots\ldots\ldots \text{Pulses/rev}$$

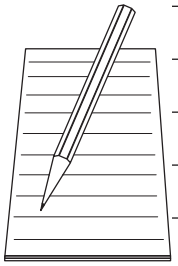
$$A_{highest} = 12000 \quad \frac{0.15}{20} = 90 \text{ Pulses/rev}$$

Possible conveyor clock generator resolution: 14 Pulses/rev (see chap. 4.6)

Selection:
Conveyor clock generator resolution = 14 Pulses/rev







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