

Operating Instructions and Spare Parts List

# Powder Gun Control Unit MultiTronic Air Control Unit MultiAir (CG04)



**⚠ IMPORTANT**

Before using this equipment, carefully read all instructions in this manual. Keep this manual for future reference!



# Table of contents

<b>Safety .....</b>	<b>1</b>
Personal security .....	1
Safety concept .....	1
Intended use .....	1
<b>About these operating instructions .....</b>	<b>1</b>
<b>Product description .....</b>	<b>2</b>
Field of application .....	2
MultiTronic description .....	2
MultiAir description .....	3
<b>Plugs and socket connections .....</b>	<b>4</b>
<b>Description of functions .....</b>	<b>5</b>
Special functions .....	6
Entering the special functions mode .....	6
Exiting the special functions mode .....	6
System parameter mode .....	6
Powder output correction mode .....	7
Software version .....	7
<b>System reset .....</b>	<b>8</b>
<b>MultiAir plugs and connections .....</b>	<b>9</b>
Pneumatical connection of a gun .....	10
Description of functions .....	10
<b>Technical appendix .....</b>	<b>11</b>
System release and powder coating .....	11
System parameter table .....	12
Carrying out a powder output correction .....	13
Procedure .....	13
Daily correction value for powder output .....	13
<b>Fault message table .....</b>	<b>14</b>
<b>DigitalBus - parallel interface .....</b>	<b>16</b>
Data bus .....	16
Data transmission byte (bit 1-8) .....	16
Data identification (bit 9-11) .....	17

(Fortsetzung)

**Inhaltsverzeichnis (Fortsetzung)**

Control bus .....	17
Digital output composite error message .....	17
Bus control .....	17
Control sequence - time diagram .....	18
Control sequence for switching the program number (Identification number 6) .....	18
Control sequence for programm parameters (Identification numbers 0-5) .....	18
<b>Software description .....</b>	<b>19</b>
Guide values for MultiTronic with PI 3 injectors .....	20
<b>Guide values - application .....</b>	<b>20</b>
General conditions for PI 3 injectors .....	20
Guide values for spray current limitation .....	20
<b>Pin assignment .....</b>	<b>21</b>
Main power supply cable socket 2.1 .....	21
Gun 1 - Gun 10 (OptiGun GA02 / PG 1-A / PG 2-A powder gun plug) 21	
2.4 Data I/O socket (Communication with MultiAir Control Unit) .	21
DigitalBus: 19-pin Aux - 2.5 socket .....	22
<b>Electrical diagrams .....</b>	<b>23</b>
MultiTronic Control Unit .....	23
MultiAir Pneumatical Unit .....	24
MultiTronic System with Digital Connector .....	25
CD 02 Digital Connector with connection designation .....	26
CD 02 Digital Connector X1-X5 plug .....	27
<b>Pneumatical diagram .....</b>	<b>28</b>
MultiAir Pneumatic Unit .....	28
<b>Spare parts list .....</b>	<b>29</b>
Ordering spare parts .....	29
MultiTronic Control Unit .....	30
MultiAir Pneumatical Unit .....	31
CD 02 DigitalConnector .....	32
<b>Technical Data .....</b>	<b>39</b>
MultiTronic - Basis model .....	39
MultiAir - Air control .....	39

# Safety regulations for stationary electrostatic powder spraying equipment

## 1 Safety symbols (pictograms)

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the powder spraying equipment. These safety regulations must be read and understood before the spraying paint equipment is used.

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



**Danger!**

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



**Warning!**

**improper use of the equipment could damage the machine or cause it to malfunction.** Possible consequences: minor injuries or damage to equipment.



**Information!**

useful tips and other information.

## 2 Conformity of use

1. The stationary powder spraying equipment is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating in zone 22.
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 powder spraying equipment is to be used for other purposes or other substances outside of our guidelines then ITW Gema AG should be consulted.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The stationary powder spraying equipment 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 powder spraying equipment has been set up and wired according to the guidelines for machinery (98/37 EG). EN 60204-1 (Machine safety) must also be observed.
5. Unauthorized modifications to powder spraying equipment 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. (see Appendix „Standards“)
7. Furthermore the country-specific safety regulations must be observed.

Explosion protection	Type of protection	Temperature class
0102 II (2) D	IP54	T6

## 3 Technical safety regulations

### 3.1 General information

The powder spraying equipment from ITW Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. It should also be noted that because of this 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.
  - 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 ZH1/444 and VDE regulations DIN VDE 0147, Part 1, must be observed for safe operation.
  4. Safety precautions specified by local legislation must be observed.
  5. The plug must be disconnected before the machine is opened for repair.
  6. The plug and socket connection between the powder spraying equipment and the mains network should only be taken out when the power is switched off.
  7. The connecting cable between the controlling device and the spray gun must be set up so that it cannot be damaged during operation. Safety precautions specified by local legislation must be observed !
  8. Only original ITW-Gema replacement parts should be used, because the explosion protection will also be preserved that way. Damage caused by other parts is not covered by guarantee.
  9. If ITW-Gema powder spraying equipment is used in conjunction with machinery from other manufacturers then their safety regulations must also be taken into account.
  10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions!  
Familiarization during operation is too late!
  11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable ! No smoking during powder coating!
  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 themselves is responsible for safe operation of equipment. ITW-Gema is in no way responsible for any resulting damages.**

### **3.2 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" chapter. The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The control devices for the spray guns must only be set up and used outside of the danger zone. Only the spray gun should be used in areas where there is a danger of powder ignition (a power/air mixture can ignite!)

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.

### **3.3 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 see to it that no non-authorized personnel work on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).
3. 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.
4. The operator is obliged to check that the powder spraying equipment is only operated when in satisfactory condition.
5. As far as is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).
6. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.
7. 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 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.
8. 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.

### **3.4 Notes on special types of hazard**

#### **3.4.1 Power:**

It is necessary to refer once to the danger to 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 the danger of electric shock.

**3.4.2 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.

**3.4.3 Static charges**

Static charges can have the following consequences: Charges from people, electric shocks, sparking. Charges from objects must be avoided – see Earthing.

**3.4.4 Earthing**

All electricity conducting parts and machinery found in the workplace (according to DIN VDE 0745, Part 102) must be earthed 1.5m either side and 2.5 m around each booth opening. The earthing resistance must amount to  $\leq 1 \text{ M}\Omega$ . 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.

**3.4.5 Compressed air:**

When there are to be longer pauses or stand-still times between working then 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.

**3.4.6 Crushing and cutting**

Whilst in 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.

**3.4.7 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.

**3.5 Prohibition of unauthorized conversions and modifications to machines**

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

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

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

#### **4 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, and in particular the machinery within 5 m 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  $\leq 1 \text{ M}\Omega$ .
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturers instructions must be observed when using such cleaning agents.
12. The manufacturers instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, tears) or missing then it should not be used.
14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original ITW-Gema replacement parts should be used.
15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.
16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of  $20 \text{ g/m}^3$  should be used.

## 5 A summary of the rules and regulations

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

### 5.1 Accident prevention regulations e.g.

<b>VBG 1</b>	General Regulations
<b>VBG 4</b>	Electrical equipment and material.

### 5.2 Guidelines

<b>ZH 1/200</b>	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (Guideline "Static Electricity") <sup>1)</sup>
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### 5.3 Safety regulations

<b>ZH 1/444</b>	Safety rules for electrostatic spraying of flammable coating powders with hand held powder equipment (electrostatic powder coating) <sup>1)</sup>
<b>ZH 1/200</b>	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (static electricity) <sup>1)</sup>
<b>EN 292-1 EN 292-2</b>	Machine safety <sup>2)</sup>
<b>EN 50 050</b>	Electrical equipment for areas where there is danger of explosion- electrostatic hand held equipment <sup>2)</sup>
<b>EN 50 053 Part 2</b>	Regulations for the selection, setting-up and use and application of electrostatic spraying equipment for inflammable spraying materials – electrostatic hand held equipment for powder <sup>2)</sup>
<b>EN 50 177</b>	Stationary electrostatic spraying equipment for flammable coating powder <sup>2)</sup>
<b>VDMA 24371</b>	Guidelines for electrostatic coating with synthetic powder <sup>1)</sup> - Part 1 General requirements. - Part 2 Examples of use.

### 5.4 Source

<b>ZH 1/310</b>	Leaflet on the use of tools in locations where there is danger of explosion. <sup>1)</sup>
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### 5.5 European Standards EN

<b>EN 60 204</b> identical <b>DIN VDE 0113</b>	VDE Regulations for the setting up of high-voltage electrical machine tools and processing machines with nominal voltages up to 1000 V <sup>3)</sup>
<b>EN 50 014</b> to <b>EN 50 020</b> identical <b>DIN VDE 0170/0171</b>	Electrical equipment for locations where there is danger of explosion <sup>3)</sup>
<b>EN 60529</b> identical <b>DIN 40050</b>	IP-Type protection: contact, foreign bodies and water protection for electrical equipment. <sup>2)</sup>

### 5.6 VDE (Association of German Engineers) Regulations

<b>DIN VDE 0100</b>	Regulations for setting-up high voltage equipment with nominal voltages up to 1000V. <sup>4)</sup>
<b>DIN VDE 0105</b>	VDE Regulations for the operation of high voltage equipment. <sup>4)</sup>
<b>Part 1</b>	General regulations.
<b>Part 4</b>	Supplementary definitions for stationary electrical spraying equipment.
<b>DIN VDE 0147</b>	Setting up stationary electrostatic spraying equipment <sup>4)</sup>
<b>Part 1</b>	
<b>DIN VDE 0165</b>	Setting up electrical equipment in locations where there is a danger of explosion. <sup>4)</sup>

Source:

<sup>1)</sup> Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association.

<sup>2)</sup> Beuth Verlag GmbH, Burggrafenstrasse 4, 1000 Berlin 30

<sup>3)</sup> Generalsecretariat, Rue Bréderode 2, B-1000 Brüssel, or the appropriate national committee.

<sup>4)</sup> VDE Verlag GmbH, , Bismarckstrasse 33, 1000 Berlin 12

## Technical Data

### MultiTronic - Basis model

Mains connection:	
Input voltage:	100 - 240 VAC
Tolerance:	+/- 10%
Power consumption:	300 VA
Type of protection:	IP54
Temperature range:	10° C bis +40° C
Dimensions:	
Width:	425 mm
Height:	180 mm
Depth:	370 mm
Weight:	10,9 kg
Attachable electrostatic guns:	
Automatic guns:	OptiGun GA 02 / PG 2-A
Tribo guns:	Connection possible
Desired output voltage:	10 V - 17 kHz - 1.20 A

### MultiAir - Air control

Mains connection:	
Input voltage:	100 - 240 VAC
Tolerance:	+/- 10%
Power consumption:	200 VA
Type of protection:	IP54
Temperature range:	10° C bis +40° C
Dimensions:	
Width:	425 mm
Height:	180 mm
Depth:	315 mm
Weight:	17,2 kg
Pneumatical data:	
Input pressure:	6.5 - 9.0 bar
Max. water vapour content:	1.3 g/m <sup>3</sup>
Max. oil vapour content:	0.1 mg/kg (oil/water)
Max. compressed air consumption:	90 m <sup>3</sup> /h (dependend on the number of guns)



## Safety

### Personal security

- The MultiTronic / MultiAir CG04 Control Unit may be switched on and operated only after carefully reading these operating instructions
- Do not dismantle, bridge or bypass the safety appliances
- Safety appliances must be held in safe function and not set out of operation.
- Maintenance work at the MultiTronic / MultiAir CG04 Control Unit may take place only when the plant is in a standstill. Switch off the plant, lock the main switch and take away the key!

### Safety concept

The MultiTronic / MultiAir CG04 Control Unit is part of the plant and therefore integrated in the safety concept of the plant. For the use outside of this security concept, appropriate measures must be taken.

### Intended use

The MultiTronic / MultiAir CG04 Control Unit is intended only for the defined field of function. The use outside of this range is considered as not intended use.

## About these operating instructions

These operating instructions contain all important information which is required to operate your MultiTronic powder coating equipment. It will guide you safely through the installation stage, give you notes and tips for the optimum use of your new powder coating equipment. Information about the functioning of individual system components will be found in the respective documentation.

### Abbreviations used in these operating instructions:

<b>DB</b>	DigitalBus
<b>EL</b>	Electrode rinsing air
<b>FL</b>	Conveying air
<b>FL_min</b>	Minimum powder output
<b>GL</b>	Total air volume
<b>HV_BG</b>	High voltage limitation
<b>I_BG</b>	Voltage limitation
<b>PA%</b>	Powder output (percent)
<b>SKW%</b>	Correction value
<b>ZL</b>	Supplementary air

## Product description

### Field of application

The MultiTronic Control Unit is an intelligent gun control, which makes it possible to control completely up to 10 powder guns at the same time. The MultiTronic Control Unit is composed of a control unit for the high voltage generation. A separate control unit (MultiAir) is used for the air-technology.

### MultiTronic description

The MultiTronic Control Unit is a complete control unit for up to 10 powder guns.

The control electronics, based on a micro-controller, makes it possible to expand the functions with corresponding electronic modules at any time.

All coating parameters (desired values and actual values) have their individual display and input unit to allow the highest user-friendly operation.



Fig. 1

Up to 255 coating programs can be stored and instantly recalled.

The stored programs help considerably to increase the repeatability of uniform coating results and quality at any time, independent of the operator and the type of powder used.

The powder volume is set independent from the total air volume. The allotment of the conveying air and supplementary air takes place automatically.

The components needed for it are integrated in the MultiAir Pneumatic Control Unit.

With freely selectable high-voltage or spraying current for all guns at the same time, optimum high voltage generation is guaranteed, also for the highest application demands.

Various diagnostic functions, indicated through LEDs and seven segment displays, increase the process reliability and make operation easier.

The most important characteristics of the MultiTronic Control Unit are:

- 255 stored coating programs possible  
Possible settings for every coating program, valid for all guns at the same time:
- High voltage (kV)
- Spraying current ( $\mu\text{A}$ )
- Electrode rinsing air ( $\text{Nm}^3/\text{h}$ )

- Powder output (%)
- Total air volume (conveying air plus supplementary air - Nm<sup>3</sup>/h)
- Individual input and display window for high-voltage, spraying current, electrode rinsing air, powder output, total air volume and programs
- Diagnostic functions
- Power supply - 100-240 VAC
- DigitalBus - parallel interface to PLC
- Controlling of all coating parameters "online":  
Gun: high voltage / spraying current / electrode rinsing air  
Injector: powder output / total air (conveying air plus supplementary air)
- Controlling of up to 255 decentral stored coating programs in the MultiTronic Control Unit

### **MultiAir description**

The MultiAir Control Unit controls up to 10 injectors at the same time. The total air volume, the powder output and the electrode rinsing air are set with the MultiTronic Control Unit. Some electropneumatically pressure regulating valves control correctly the adjusted values. An integrated pressure sensor monitors the input pressure and assures an optimal coating result with every input pressure. A main solenoid valve switches on/off the air for 10 guns for the powder output.



Fig. 2

## Plugs and socket connections

The MultiTronic control unit is assembled and ready for use from the factory. Only a few cables and hoses must be connected by the customer.



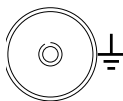
Fig. 3

### Pos. 1



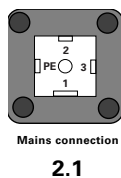
Connect the gun cable with the 7-pin plug on the backside of the control unit to the **Gun 1 - Gun 10** socket (always begin with Gun 1)  
Type of gun: OptiGun **GA02 / PG 2-A** - optional

### Pos. 2



Connect the grounding cable with the grounding screw to the control unit and fasten the 5 m long grounding cable with the clamping pliers at the booth or the workpiece hangers

### Pos. 3



Connect the main power supply cable to the socket **2.1 - Mains connection**  
*This plug may be never connected under tension!*

### Pos. 4



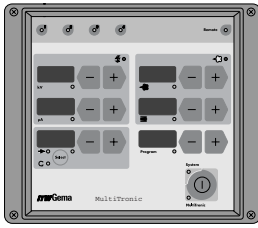
**Aux 1 - 2.4** socket  
The internal MultiAir communication is made by this 12-pin socket

### Pos. 10



**Aux 2 - 2.5** plug  
A superior control (PLC) is connected by this 19-pin plug (parallel interface)

## Description of functions



Each of the coating parameters of the MultiTronic Control Unit has its own display and its own operating area



The fault diagnostic LEDs indicate the equipment faults. The MultiTronic control unit is functioning correctly when the **diagnostic LEDs 1, 2, 3 and 4** are illuminated (green)

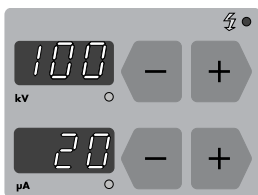
**If any of the diagnostic LEDs does not illuminate, please contact an ITW Gema Service Centre!**

Functions of the diagnostic LEDs:

- 1** green: +24 VDC power supply present, MultiAir ready
- 2** green: +15 VDC internal power supply present
- 3** green: +5 VDC internal power supply present
- 4** green: MultiAir main solenoid valve ready



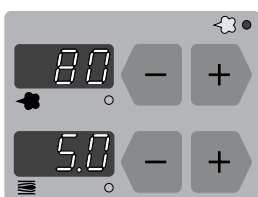
The equipment is activated or deactivated with the main key pad. If the control is active, the green MultiTronic LED (lower left) is illuminated. In addition, if the green system LED (upper left) is illuminated, the equipment is released for coating by external control



- **kV** display and setting of high voltage output (setting range: 0-100 kV)
- **μA** display and setting of spraying current (setting range: 0-100 μA)



- **Electrode rinsing air** → display and setting of the electrode rinsing air output (setting range: 0-2.8 Nm<sup>3</sup>/h, default value: 0,2 Nm<sup>3</sup>/h), **Select**-key is not used



- **Powder output** ☁ display and setting of the powder output (setting range: 0-100 %)
- **Total air volume** ≡ display and setting of the total air volume (setting range: 1,8-8,0 Nm<sup>3</sup>/h)



- **Program** display and setting of the program number (setting range: 1-255), as well as fault message display and fault message acknowledgement



This LED (red) illuminates when there is a fault in the high-voltage system



This LED (red) illuminates when there is a fault in the pneumatic system



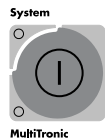
This LED (green) illuminates when the control unit is remote-controlled by a superior control (PLC)

## Special functions

Various device settings are made in the special function mode, which contains following settings:

- a) System parameter selection
- b) Powder output correction
- c) Software version

### Entering the special functions mode



Press the **main key pad** (for approx. 10 secs) until the display no longer illuminates



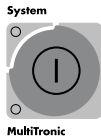
All the green **diagnostic LEDs** should illuminate. If not, see „Description of functions - fault diagnostic LEDs“

### Exiting the special functions mode

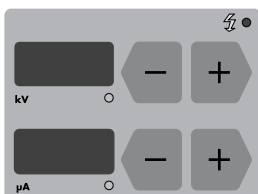


The special functions mode can be terminated by pressing shortly the **main key pad**

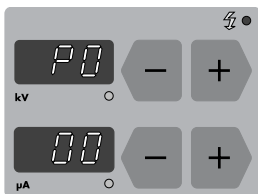
### System parameter mode



1. Press the **main key pad** (for approx. 10 secs) until the display no longer illuminates



2. The system parameter mode is entered by pressing any **+** or **-** key in the **kV** or **μA** display area



3. Select the system parameter (**P00-P08/PE/PL**) with the **+** or **-** key
4. Change the system parameter value with the **+** or **-** key (see "System parameter table")



**You will find the system parameter table in the "Technical appendix"**

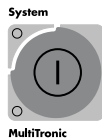


5. The special parameter mode can be exited by pressing the **main key pad**

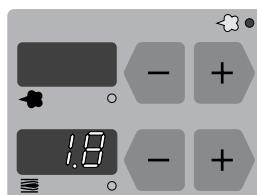
## Powder output correction mode

The MultiTronic Control Unit makes possible the accommodation of the differing powder outputs in the plant caused by differing powder hose designs and lengths to the individual guns. The minimum powder output (**FL\_min**) and the maximum powder output (**SKW%**) can be accommodated for with two parameters.

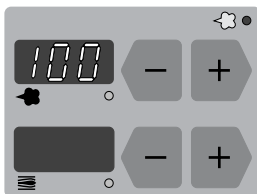
Powder output corrections are made at the first start-up, after servicing, after application problems or by use of hoses with a different diameter to that used previously.



To enter the powder output correction mode, press the **main key pad** (for approx. 10 secs) until the display no longer illuminates



1. The value for minimum powder output (**FL\_min**) is set with the **+** or **-** keys in the display window



2. The value for maximum powder output (**SKW%**) is set with the **+** or **-** keys in the display window



3. Exit the special functions mode by pressing the **main key pad**



**You will find the procedure of powder output correction in the "Technical appendix"**

## Software version



1. To verify the software version, press the **main key pad** (for approx. 10 secs) until the display no longer illuminates



2. The software version number is called up by pressing the **+** or **-** key of the **Program** display



3. The software version number of the MultiTronic operating program is displayed



4. The special functions mode can be terminated by pressing the **main key pad**

### Abbreviations:

**EL** Electrode rinsing air  
**FL** Conveying air

**FL\_min**  
**SKW%**  
**ZL**

Minimum powder output  
Powder output correction value  
Supplementary air

## System reset

A system reset is initiated at the first start-up and at function faults!



**A system reset overwrites all 255 programs with default values and the system parameters are returned to their original factory settings!**



1. The MultiTronic Control Unit can be switched off with the **main power switch**
2. Hold the **main key pad** pressed and switch on the **main power switch**. After approximately 15 seconds, the actual program numbers 001-255 appear in the **Program** display window and the programs are individually reset to the factory default values. The **main key pad** only has to be pressed until the program numbers start to run through in rapid succession in the display window  
*Fault diagnostic LED 4 is off during the reset*

After a **system reset** the system parameters, please verify that they are correct!

## MultiAir plugs and connections

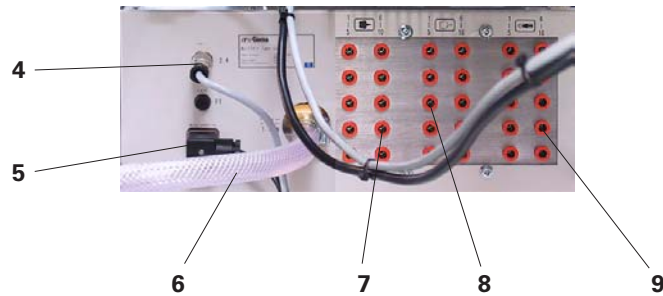
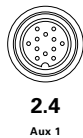


Fig. 4

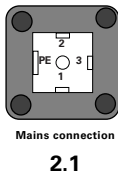
**Pos. 4**



**Aux 1 - 2.4 socket**

The internal MultiAir communication is made by this 12-pin socket

**Pos. 5**



Connect the main power supply cable to the socket **2.1 - Mains connection**

*This plug may be never connected under tension!*

**Pos. 6**

Compressed air supply **1.1 IN**

The hose for the compressed air supply from the compressed air circuit is connected directly to the main air connection - **1.1 IN** on the rear of the control unit (inside hose diameter 16 mm)



**The compressed air input pressure must be set at 6.5 bar during operation and should not surmount 9 bar. The compressed air must be free from oil and water.**

**Pos. 7**



Conveying air connection

The red hose for the conveying air is connected to the to the injector

**Pos. 8**



Supplementary air connection

The black hose for the supplementary air is connected to the injector

**Pos. 9**



Rinsing air connection

The hose for the rinsing air is connected to the electrode rinsing air output and to the powder gun

## Pneumatical connection of a gun

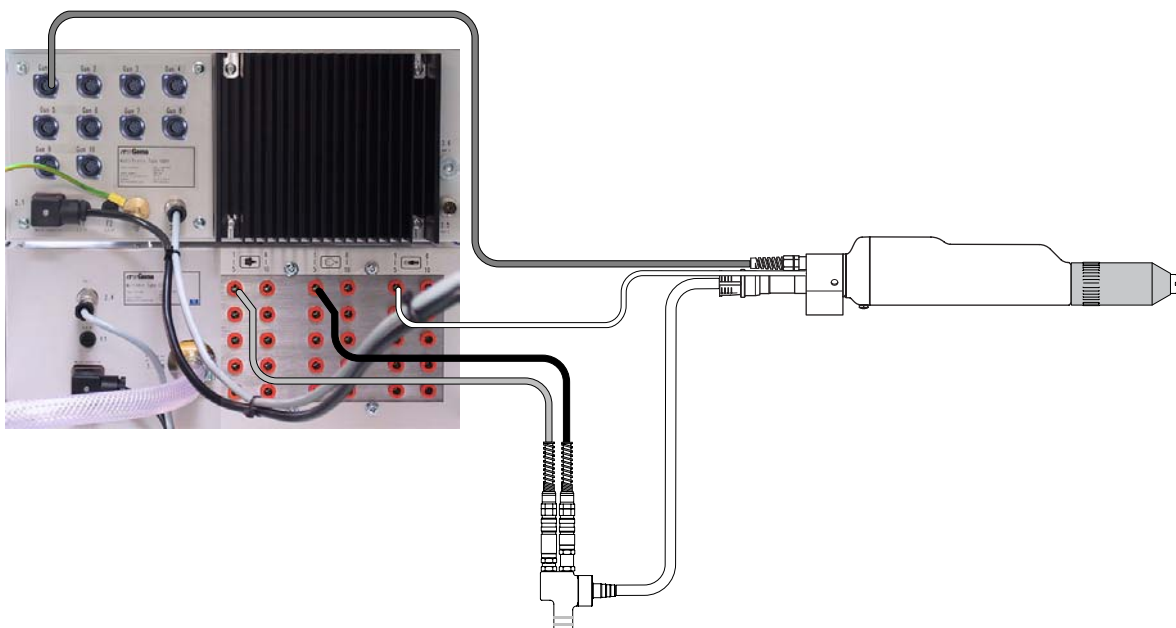


Fig. 5

## Description of functions

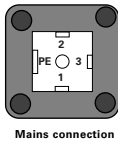
The pneumatical functions for the powder output are controlled by the MultiAir Control Unit. Press the **main key pad** for start-up. The MultiTronic Control Unit takes over all control functions.

## Technical appendix

In this chapter you will find further information about handling, connections and some diagrams.

### System release and powder coating

The release of the MultiTronic Control Unit should take place only after fulfilment of all demanded safety aspects (fire protection etc.). The release is activated through the connection no. 3 (2.1 Mains connection).



Mains connection

#### 2.1

Connection no. 3: System release  
System-LED illuminates green

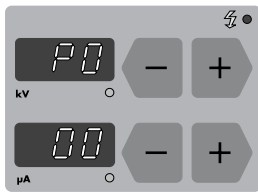
Control voltage: 100 - 240 VAC

The MultiTronic Control Unit is ready for coating:

- a) MultiTronic Control Unit activated and ready for operation: MultiTronic-LED illuminates green
- b) Control voltage for System release ready: System-LED illuminates green
- c) Automatic powder gun connected: Powder output

The system release can also take place through the parallel interface AUX 2 - 2.5, see "Technical appendix", chapter "DigitalBus"

## System parameter table



Parameters (**P00-P09/PE/PL**)

Values

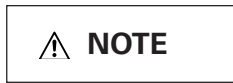
Abbreviations used in these pages:

- EL = Electrode rinsing air
- FL = Conveying air
- GL = Total air
- PA% = Powder output (in percent)
- ZL = Supplementary air

Parameter number	Description	Values <i>(The <b>bold</b> numbers [0 or 1 etc.] in this column are default values)</i>	Remarks
<b>P0:</b>	Number of guns	<b>10</b> = 10 guns 1 - 10	Always beginning at port 1
<b>P1:</b>	Gun type	<b>0</b> = Gun type: OptiGun GA02 / PG 1 = Tribo gun	Select gun type, No kV value displayed in normal mode
<b>P2:</b>	Gun test	<b>0</b> = Gun test mode inactive 1 = Gun 1 Test 2 = Gun 2 Test N = Number of guns according P0	Parameter for separate high voltage control Normal operation P2 = 0
<b>P3:</b>	Injector type	(Nozzle ø in mm) FL ZL <b>0</b> = PI 3 = 1,6 1,4	Select injector type, ø 1,6 mm - with notch, match the injector nozzle/throttle with the corresponding injector
<b>P4:</b>	not used		
<b>P5:</b>	not used		
<b>P6:</b>	Communication	<b>0:</b> DigitalBus 1: CAN	Communication initialization
<b>P7:</b>	Display variation	<b>0</b> = PA%,  = GL m³/h 1  = FL m³/h,  = GL m³/h	Standard display Display of individual air volumes FL and GL for checking purposes
<b>P8:</b>	Tolerance band	<b>0</b> = 0,05 m³/h 1 = 0,1 m³/h 2 = 0,2 m³/h	Tolerance band for air volume regulation
<b>P9:</b>	Tolerance band Error message	1 = 0,3 bar <b>2</b> = 0,2 bar 3 = 0,3 bar 4 = 0,4 bar	Calculated air volume in Nm³/h
<b>PE:</b>	not used		
<b>PL:</b>	not used		

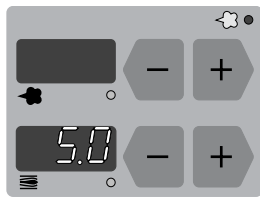
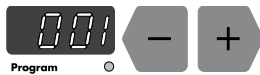
## Carrying out a powder output correction




In the powder output correction mode, the minimum powder output of all guns can be adjusted.



**Consider when laying the powder hoses that they have all the same length!**

### Procedure



1. Select the program number **001** in the program display
2. Set the total air up to **5.0 (Nm<sup>3</sup>/h)** in the display , if not already adjusted  
Set the powder output up to **00 (%)** in the display 
3. Enter the special functions mode by pressing the **main key pad** (for approx. 10 secs) until the display no longer illuminates
4. Set the value for minimum powder output so, that all guns spray the same little quantity of powder
5. Set the correction value (**SKW%**) for maximum powder output up to **100 %** in the display 

Exit the special functions mode by pressing the **main key pad**.

## Daily correction value for powder output

The daily correction value for powder output can be set through the DigitalBus via the PLC control unit. The daily correction value can be addressed with the identification number 7. The value range is between 50-150 %.

This means that an actual powder output value is multiplied by the correction value X:

$$\begin{aligned} \text{e.g. Powder output value PA\%} &= 50 \% \\ \text{Daily correction value} &= 60 \% \end{aligned}$$

corresponds with the new powder output value of 30 % ( $50 \times 0,6 = 30$ ). Values outside this range are rejected with an H31 error message. If the correction value multiplied by the desired value of the powder output is higher than 100 %, the output is limited to 100 % and displayed with an H09 error message.

This check takes place at a change of program and when a new correction value is set.

After switching on the equipment, the correction value is 100 %. The correction value is not stored in the EEPROM. After each start-up the PLC control must associate the daily correction value in the MultiTronic. The daily correction value for the powder output can be displayed on the MultiTronic.

### Displaying the correction value:

Press the MultiTronic-key and hold it down, then press POWDER KEY + or POWDER KEY -. The value is displayed until none of the keys are pressed anymore. All displays are not illuminated except the powder output display with the daily correction value.

## Fault message table



Fault code no.

When a fault is present in the system, the cause must be eliminated before further operation is possible. When the fault has been eliminated, this is acknowledged by pressing the + or - key of the Program-display.

Fault code air supply	Fault description
<b>H02</b>	Conveying air (FL) regulating valve fault: 1. Check the conveying air hose to the injector 2. Detach the conveying air hose from the MultiAir Control Unit and acknowledge the fault 3. Contact the ITW Gema Service Centre
<b>H03</b>	Supplementary air (ZL) regulating valve fault: 1. Check the supplementary air hose to the injector 2. Detach the supplementary air hose from the MultiAir Control Unit and acknowledge the fault 3. Contact the ITW Gema Service Centre
<b>H04</b>	Rinsing air (SL) regulating valve fault
<b>H06</b>	Main solenoid valve fault: Connection cable from main solenoid valve to basic electronics is missing Check the main solenoid valve
<b>H07</b>	The desired supplementary air volume is too large (ZL_max.) Decrease the programmed value for the total air volume and/or increase the programmed value for the powder output volume
<b>H08</b>	The desired conveying air volume is too large (FL_max.) Decrease the programmed value for the total air volume and/or decrease the programmed value for the powder output volume
<b>H09</b>	The daily correction value multiplied by the desired value of powder output is higher than 100 %. (Acknowledge the fault and decrease the daily correction value via the PLC)
<b>High voltage</b>	
<b>H10 - H 19</b>	High voltage fault gun 1 - 10 Check the basic electronics and the gun. Check the gun cable for breaks. Replace the gun

(continued)

## Fault message table (continued)

<b>Fault code generally</b>	<b>Fault description</b>
<b>H20</b>	Check the 15 VDC MultiTronic power supply. The input voltage is higher than the desired voltage - 15 VDC +10%
<b>H21</b>	Check the 15 VDC MultiTronic power supply. The input voltage is lower than the desired voltage - 15 VDC -10%
<b>H22</b>	Fault in the 24 VDC MultiAir power supply. Contact the ITW Gema Service Centre
<b>H23</b>	EEPROM fault: Contact the ITW Gema Service Centre
<b>H24</b>	EEPROM writes Timeout: Contact the ITW Gema Service Centre
<b>H25</b>	Display single gun test (system parameter P2 > 0)
<b>DigitalBus</b>	
<b>H30</b>	Data validation fault. Selection fault from the higher hierarchy control (PLC). Set the PLC program correctly
<b>H31</b>	Desired value is not within the value range. Selection fault from the higher hierarchy control (PLC). Set the PLC program correctly

## DigitalBus - parallel interface

Through the DigitalBus, the control unit is connected to a higher hierarchy control (PLC). The DigitalBus disposes of a 16-bit parallel interface. The interface comprises 14 digital inputs and 1 digital output. The digital inputs are divided into a data bus, consisting of 11 bits, and a control bus, comprising 3 bits. The digital output is an error message bit.

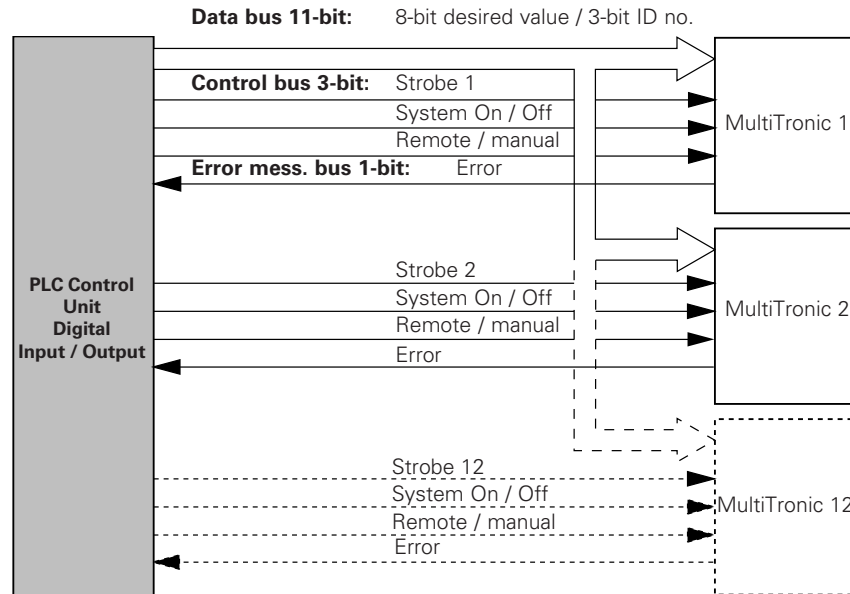


Fig. 6

### Data bus

The data bus width is 11 bits. With the first 8 bits, the data for the different operating parameters (desired values) can be transferred to the control unit. The data for the corresponding desired values (powder output, total air, electrode rinsing air, high-voltage limiting value, current limiting value, program number) are assigned with an identification number consisting of 3 bits.

### Data transmission byte (bit 1-8)

Binary values	Designation	Value range	Resolution
Bits 1-8 Valency 2 <sup>0</sup> -2 <sup>7</sup> (see also "Option DigitalBus: 19-pin plug - Aux. 2.4")	PA [%]	0-100	1
	GL [m <sup>3</sup> /h]	1,8 - 8	0,1
	EL [m <sup>3</sup> /h]	0 - 2,8	0,1
	*		
	HV_BG [kV]	0 -100	1
	I_BG [μA]	0-100	1
	Program no. PGN	1-255	1
	Daily corr. value Powder output [%]	50-150	1

\* not used

(continued)

#### Abbreviations:

**EL** Electrode rinsing air  
**GL** Total air  
**HV\_BG** High voltage limitation

**I\_BG** Current limitation  
**PA** Powder output

## DigitalBus - parallel interface (continued)

### Data identification (bit 9-11)

Identification number 3-bit (binary code)	Classification
0	PA [%]
1	GL [m <sup>3</sup> /h]
2	EL [m <sup>3</sup> /h]
3	*
4	HV_BG [kV]
5	I_BG [μA]
6	Program no. PGN
7	Daily correction value Powder output [%]

\* not used

### Control bus

The Control Bus consists of 3 bits:

Strobe:	Activates data reception
System On / Off:	MultiTronic system release
Remote / manual:	Operating mode

### Digital output composite error message

The composite error message **Error** shows all errors which are present in the control unit.

Dig. output	Error=high	Composite error Control unit
-------------	------------	---------------------------------

### Bus control

The data transmission from a higher hierarchy control (PLC) to the gun control unit is done with the data bus (11-bit) and the control bus (3-bit). All desired values can be transmitted with the first 8 bits (bit 1-8) of the data bus in binary code (value range 0-255). The identification number is transmitted in binary code (value range 0-7) with the last 3 bits (bit 9-11) of the data bus. The reception of data from the data bus is initiated by a negative flank of the **Strobe** control signal.

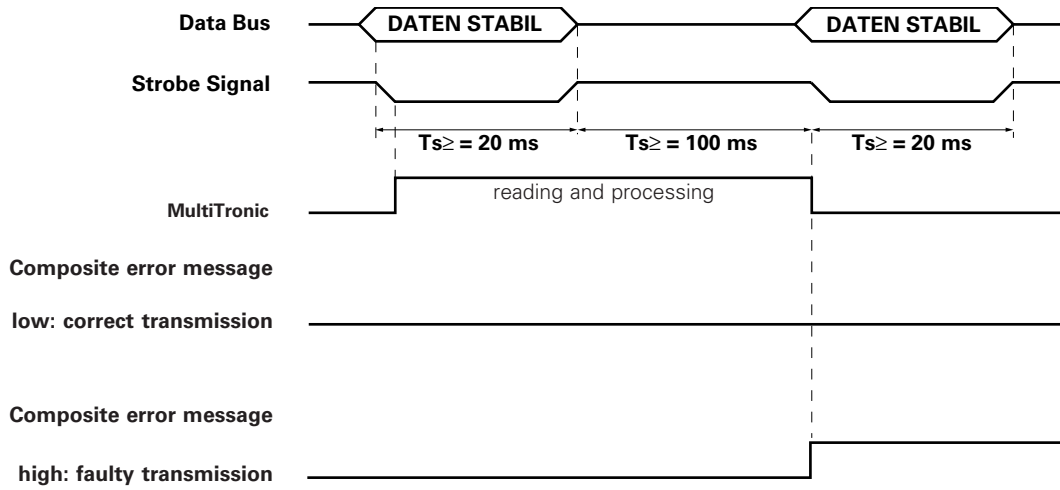
#### Abbreviations:

**EL** Electrode rinsing air  
**GL** Total air  
**HV\_BG** High voltage limitation

**I\_BG** Current limitation  
**PA** Powder output  
**SWA** Swirl air

**Control sequence - time diagram**

**Control sequence for switching the program number (Identification number 6)**



**Control sequence for programm parameters (Identification numbers 0-5)**

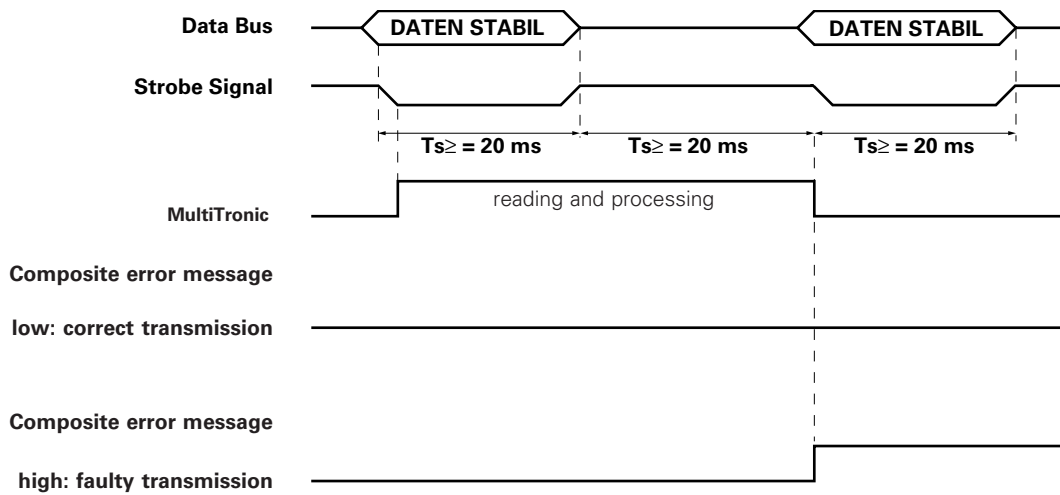


Fig. 7

## Software description

There is one strobe signal and one error signal per MultiTronic Control Unit. The data signals and identification number signals are common for all MultiTronic Control Units.

The data of the MultiTronic are taken over with the negative flank of the strobe signal.

**Explanation:** If you want to activate the same data at the same time to all MultiTronic Control Units, this can happen only with the negative flank of all strobe signals.

Example of a PLC program:

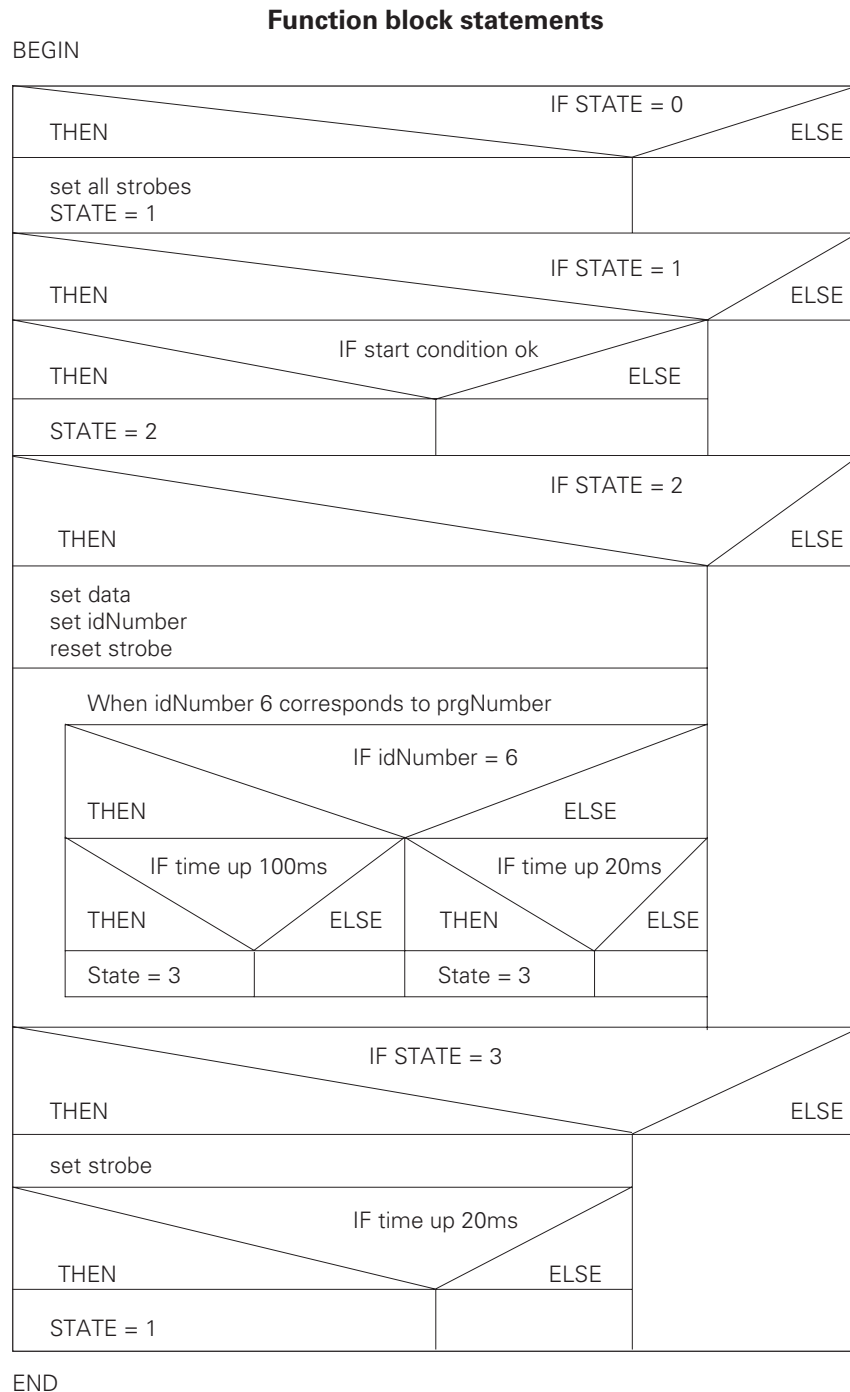


Fig. 8

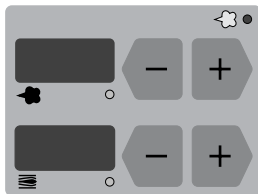
## Guide values - application

All values in these tables are guide values. Different ambient conditions, wear and different powder types can alter the values in the tables.

### General conditions for PI 3 injectors

Powder type		Epoxy/Polyester
Length of powder hose	[m]	10
Powder hose ø	[mm]	11
Input pressure	[bar]	7,0
Conveying air nozzle ø - PI 3 / OptiFlow	[mm]	1,6
Supplementary air nozzle ø - PI 3 / OptiFlow	[mm]	1,4

### Guide values for MultiTronic with PI 3 injectors



Total air		4 Nm <sup>3</sup> /h	5 Nm <sup>3</sup> /h	6 Nm <sup>3</sup> /h
		Powder output [g/min]		
Powder output  [%]	<b>10</b>	30	35	45
	<b>20</b>	60	75	90
	<b>30</b>	85	100	120
	<b>40</b>	110	130	150
	<b>50</b>	130	160	175
	<b>60</b>	150	180	210
	<b>70</b>	175	200	235
	<b>80</b>	200	240	270
	<b>90</b>	215	260	
	<b>100</b>	235	290	

### Guide values for spray current limitation



Spraying current limitation enables:

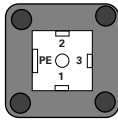
- achievement of greater stability in the coating process
- constant current values, because only the high voltage varies
- larger reproducibility of the coating results

The spray current is displayed in the  $\mu\text{A}$  window and can be set with the **+** and **-** keys (setting range 0-100  $\mu\text{A}$ ).

High voltage	with SuperCorona	without SuperCorona
100 kV	<i>flat parts:</i> 50 $\mu\text{A}$ ( $\pm 20$ )	<i>flat parts:</i> 15 $\mu\text{A}$ ( $\pm 10$ )
100 kV	<i>profiles:</i> 60 $\mu\text{A}$ ( $\pm 10$ )	<i>profiles:</i> 25 $\mu\text{A}$ ( $\pm 5$ )
100 kV	<i>spray-over:</i> 20 $\mu\text{A}$ ( $\pm 10$ )	<i>spray-over:</i> 5 $\mu\text{A}$ ( $\pm 5$ )

## Pin assignment

### Main power supply cable socket 2.1



Mains connection  
2.1

Pin	Function
1	GND 24 VDC (power supply)
2	+24 VDC (power supply)
3	System ON /OFF (gun release) 100-240 VAC
PE	Ground PE

### Gun 1 - Gun 10 (OptiGun GA02 / PG 1-A / PG 2-A powder gun plug)

Pin	Function
1	GND high voltage cascade
2	*
3	*
4	*
5	*
6	Signal high voltage cascade
7	Ground PE

\* not used

### 2.4 Data I/O socket (Communication with MultiAir Control Unit)

Pin	Function
1	GND
2	+ 24 VDC
3	Conveying air desired value
4	Conveying air actual value
5	Supplementary air desired value
6	Supplementary air actual value
7	Electrode rinsing air desired value
8	Electrode rinsing air actual value
9	MultiAir main solenoid valve ON
10	MultiAir main solenoid valve OK
11	*
12	*

\* not used

(continued)

## Pin assignment (continued)

### DigitalBus: 19-pin Aux - 2.5 socket

Pin	Bit	Function (binary value)
A	1 IN - D0	Desired value, progr. no. valency $2^0$ (=1)
B	2 IN - D1	Desired value, progr. no. valency $2^1$ (=2)
C	3 IN - D2	Desired value, progr. no. valency $2^2$ (=4)
D	4 IN - D3	Desired value, progr. no. valency $2^3$ (=8)
E	5 IN - D4	Desired value, progr. no. valency $2^4$ (=16)
F	6 IN - D5	Desired value, progr. no. valency $2^5$ (=32)
G	7 IN - D6	Desired value, progr. no. valency $2^6$ (=64)
H	8 IN - D7	Desired value, progr. no. valency $2^7$ (=128)
J	9 IN - A0	Identification number valency $2^0$ (=1)
K	10 IN - A1	Identification number valency $2^1$ (=2)
L	11 IN - A2	Identification number valency $2^2$ (=4)
M	12 IN	System ON / OFF (gun release)
N	13 IN	Strobe (data transfer from data bus)
O	14 IN	Remote/manual
P	15 IN	Reserve - IN
R	16 IN	GND external
S	1 OUT	Composite error message (signal: Error)
T		
U		24 VDC external
Housing		Screen

**Electrical diagrams**  
**MultiTronic Control Unit**

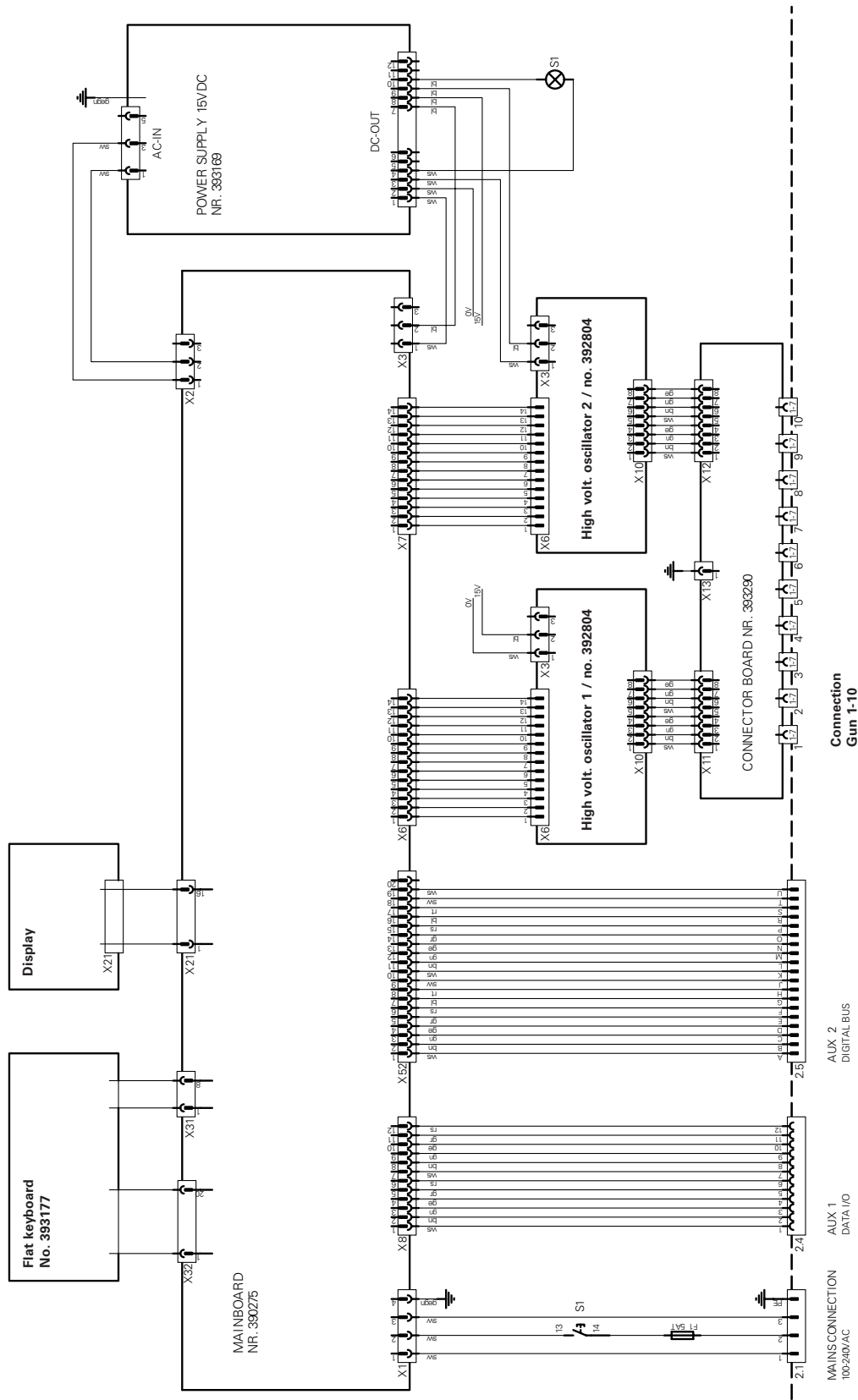


Fig. 9



**MultiTronic System with Digital Connector**

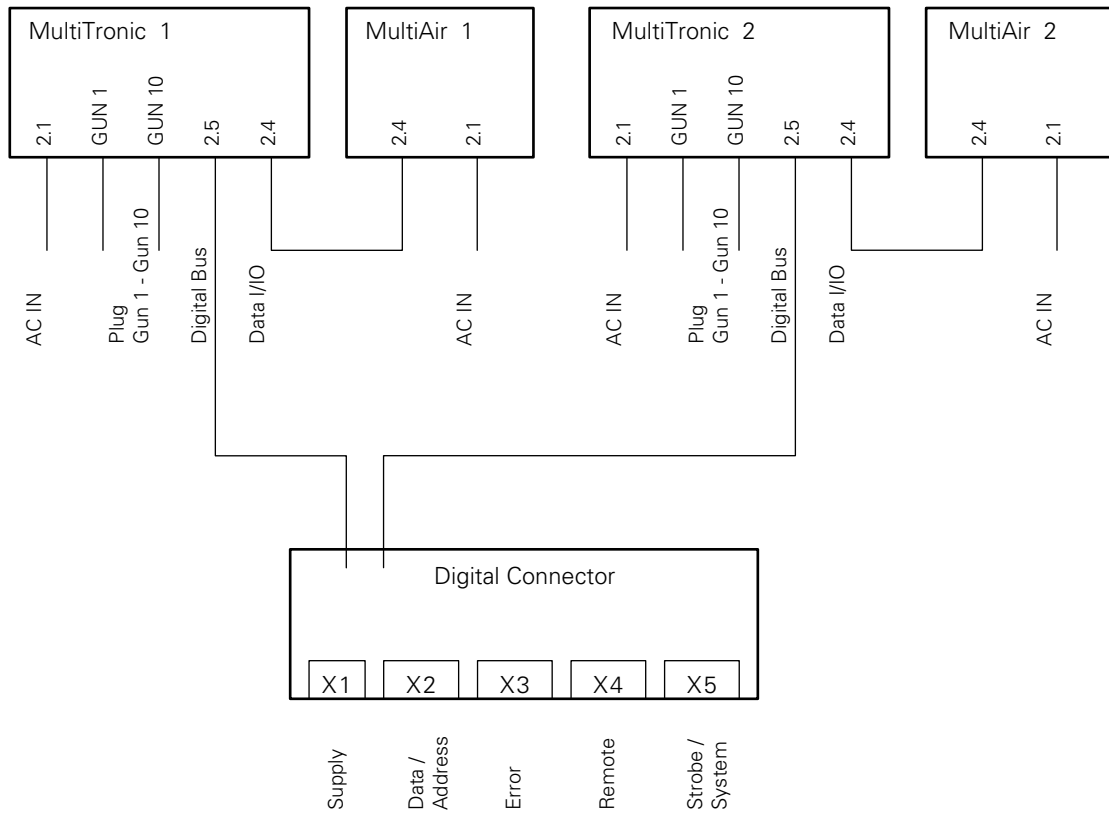


Fig. 11

**CD 02 Digital Connector with connection designation**

<b>1-12 Strobe</b>	<b>1-12 not used</b>	<b>1-12 not used</b>	<b>1-8 / 13-20 D0-D7</b>	<b>1: GND</b>
<b>13-24 System</b>	<b>13-24 Remote</b>	<b>13-24 Error</b>	<b>9-11 / 21-23 A0-A2</b>	<b>2: 24 VDC</b>
				<b>3: PE</b>

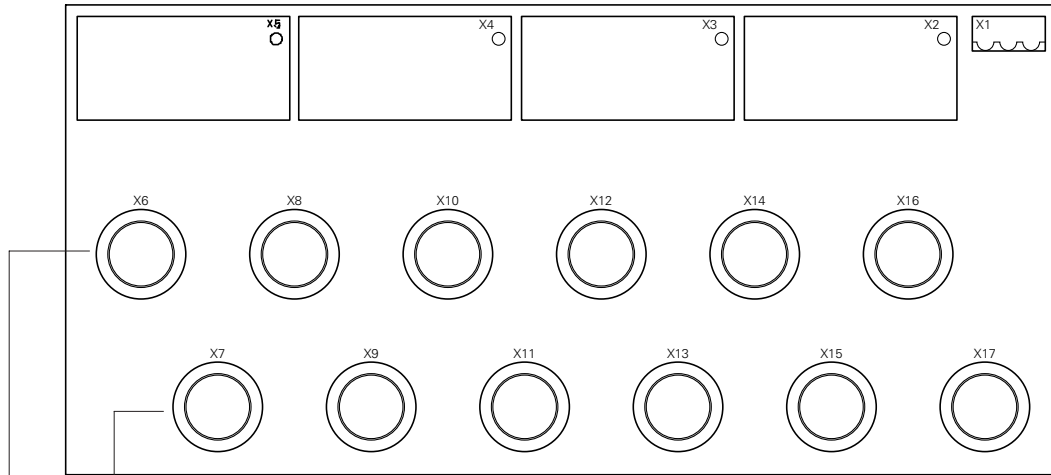


Fig. 12

**Control units: 2, 4, 6, 8, 10, 12**

**Control units: 1, 3, 5, 7, 9, 11**

**CD 02 Digital Connector X1-X5 plug**

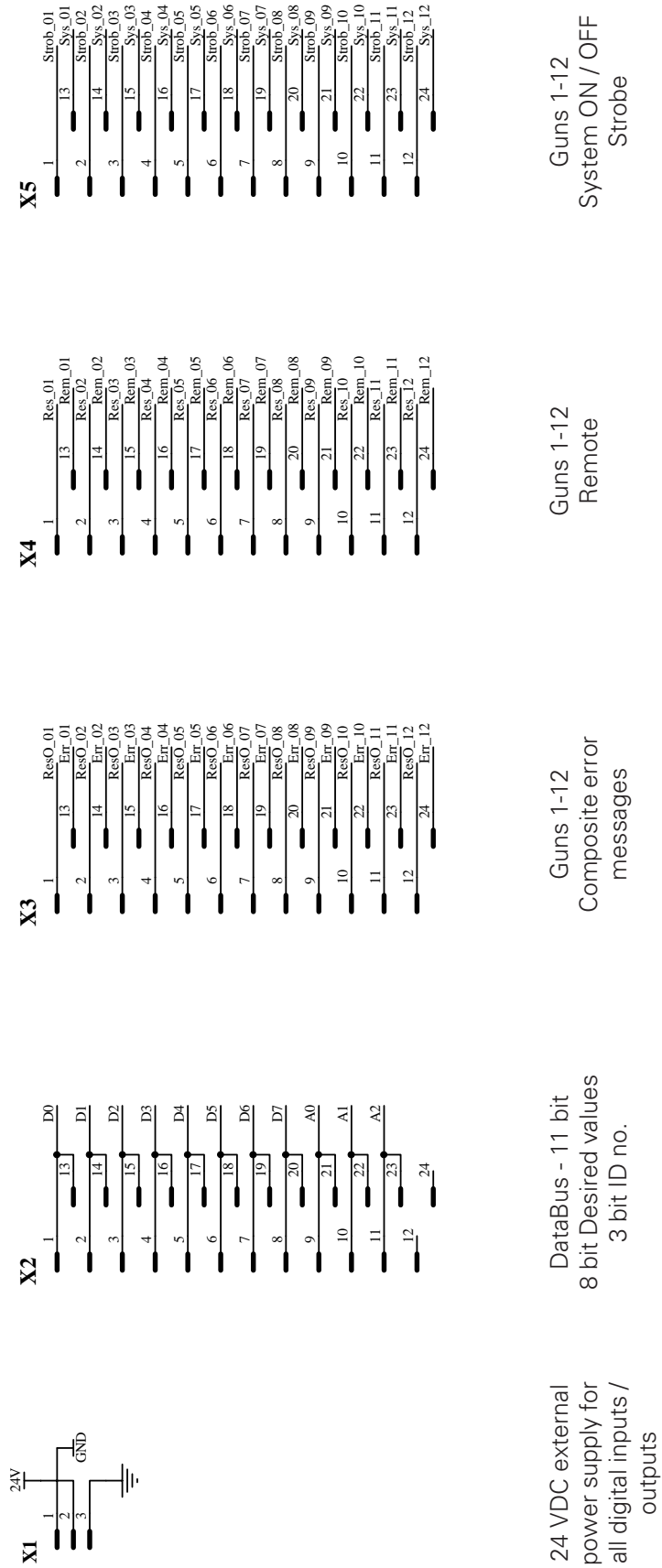


Fig. 13

**Pneumatical diagram**

**MultiAir Pneumatic Unit**

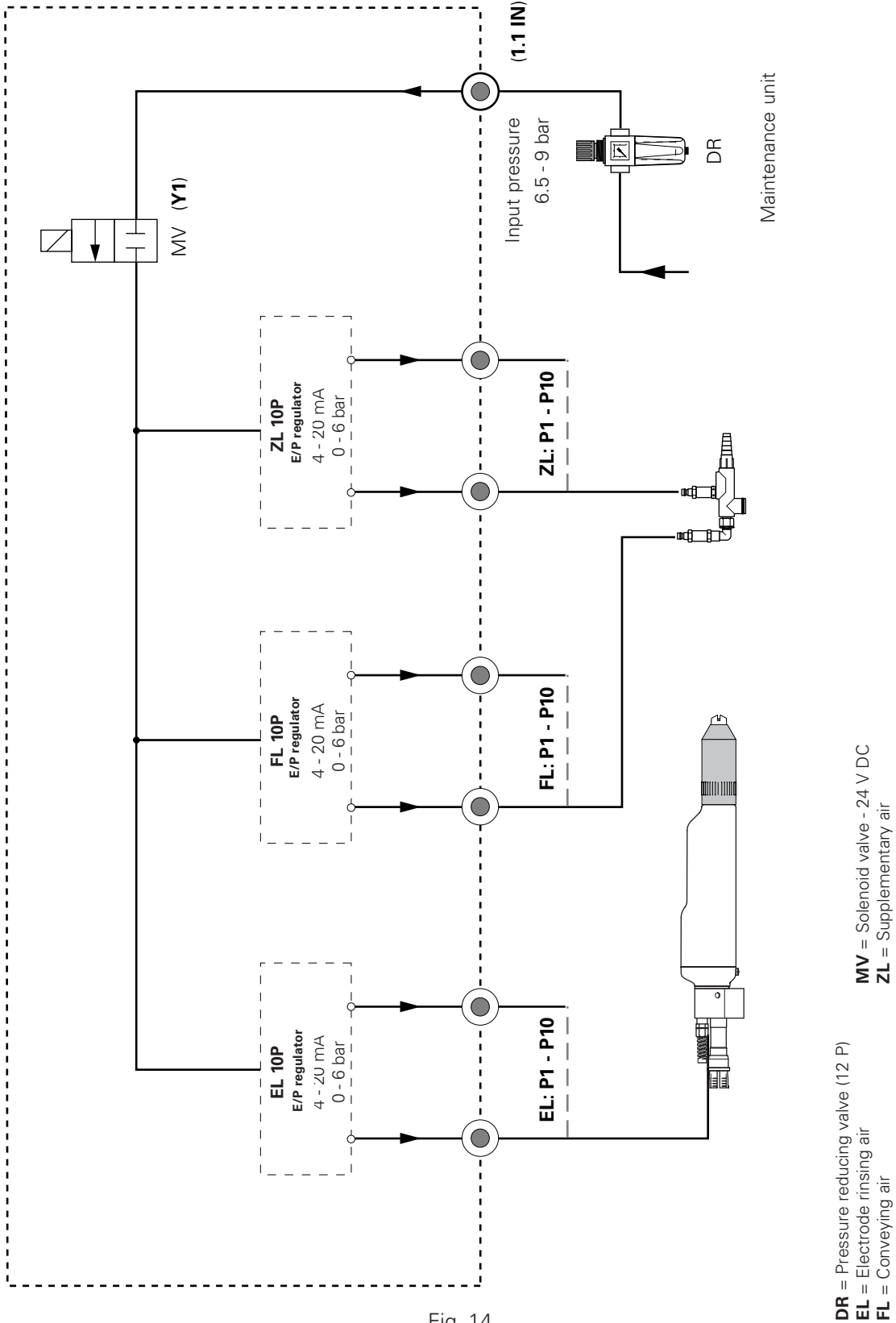


Fig. 14

## Spare parts list

### Ordering spare parts

When you order spare parts for your powder coating equipment, please indicate the following specifications:

1. Type and serial number of your powder coating equipment
2. Order number, quantity and description of each spare part

Example:

**1. Type** MultiTronic, **Serial no.:** xxxx xxxx

**2. Order no.:** 221 873, 5 pieces, 2 AT fuse

When ordering cable and hose material the length required must be indicated.

The spare part numbers of yard/meter ware always begins with **1.. ...** and are always marked with an **\*** in the spare parts list.

Wear parts are always marked with a **#**.

All dimensions for plastic powder hoses are indicated as external diameter (o/d) and internal diameter (i/d).

e.g.

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

## MultiTronic Control Unit

	MultiTronic Control Unit - complete	393 339
1	MultiTronic electronics - complete	390 275
1.1	EPROM with MultiTronic software	393 134
2	Front frame with transp. keyboard and electronics	393 266
3	Oscillator card for 5 guns - complete	392 804
4	Power pack unit 15 VDC - complete	393 169
5	Connecting cable MultiTronic-MultiAir (not shown)	393 398
6	Power supply cable - 2,5 m (not shown)	389 358
	Power supply cable - 6 m (not shown)	390 119
	Power supply cable - 20 m (not shown)	390 127
10	Locking push-button - yellow	262 820
11	Fixing flange	262 838
12	Standard auxiliary switch	262 854
	Fuse - 5 AT	200 166



2

10; 11; 12

3

1

4

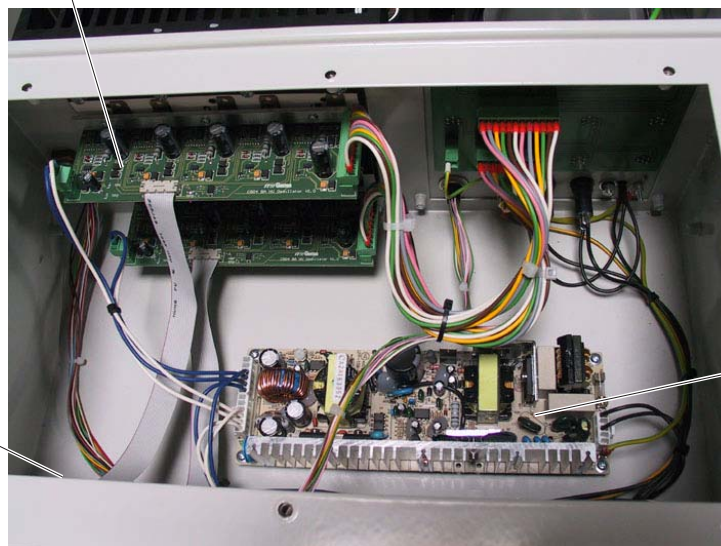


Fig. 15

**MultiAir Pneumactical Unit**

MultiAir Pneumactical Unit - complete	392 820
1 Pressure regulating valve	266 787
2 Power pack	393 002
3 MultiAir electronic card - complete	390 313
4 Pressure regulating valve - power supply cable	393 045
5 Pressure regulating valve - signal cable	393 053
6 Ventilkabel MultiAir	393 061
7 Solenoid valve - 1/2 NW11.5 24 VDC	259 195
10 Locking push-button - yellow	262 820
11 Fixing flange	262 838
12 Standard auxiliary switch	262 854
Fuse - 4 AT	200 182

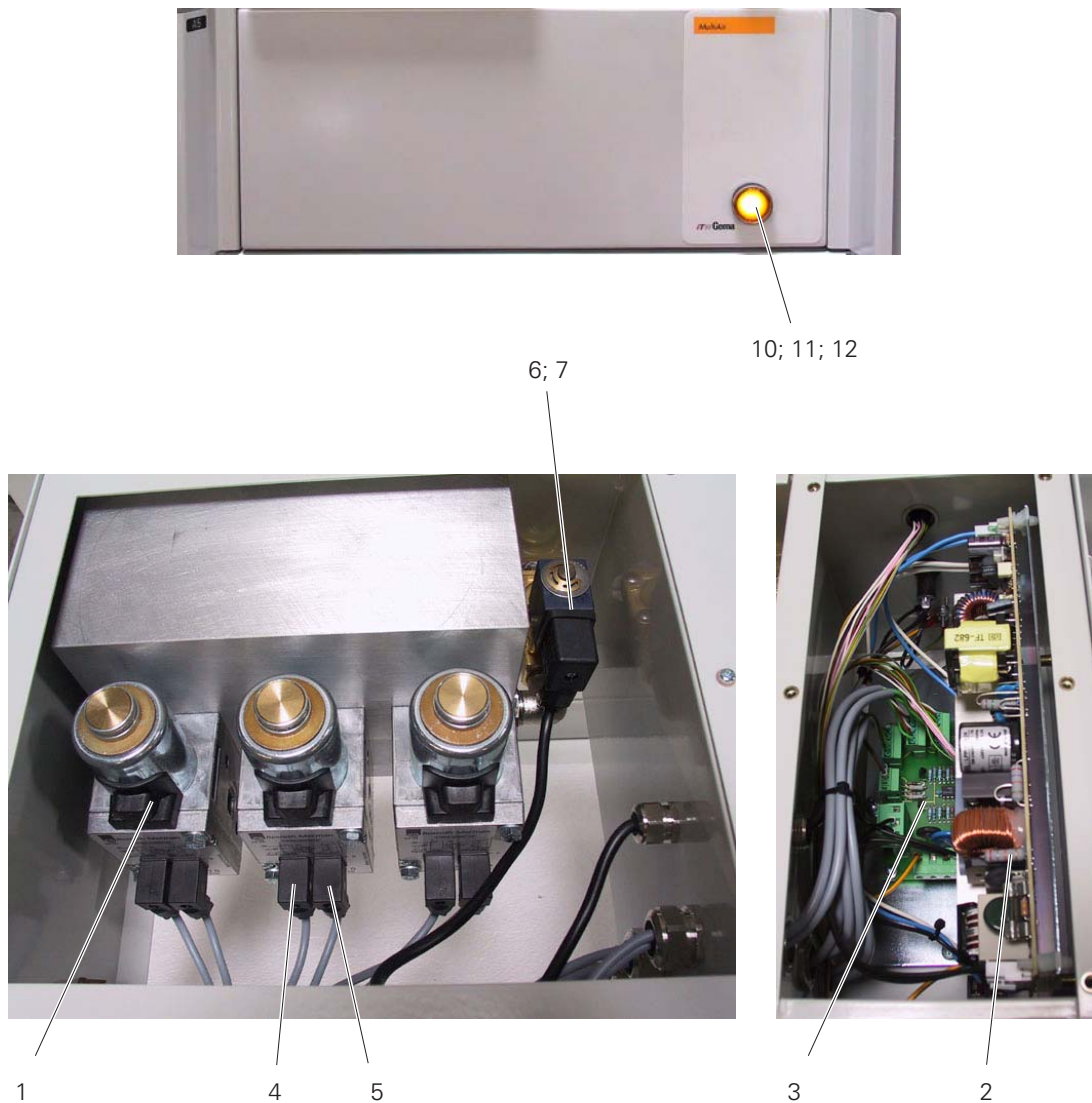


Fig. 16

## CD 02 DigitalConnector

1	CD 02 Digital Connector - for 12 MultiTronic	382 825
2	Connecting cable - 19 pin - 3,5 m	387 061
	Connecting cable - 19 pin - 4,5 m	383 570
	Connecting cable - 19 pin - 5,5 m	384 941
	Connecting cable - 19 pin - 6,5 m	383 589

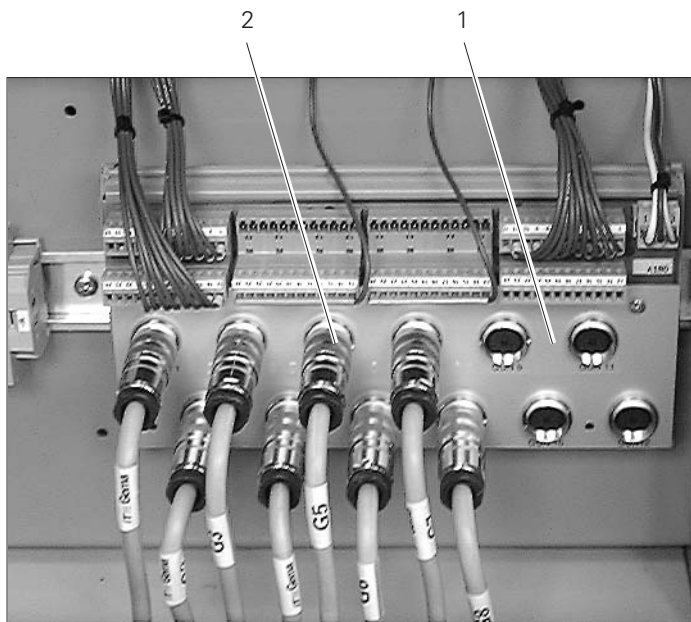


Fig. 17

**Notes:**

**Documentation MultiTronic / MultiAir CG04**

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