OptiFeed PP06(-E) powder pump
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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiFeed PP06 powder pump.

These safety regulations must be read and understood before the OptiFeed PP06 powder pump is put into operation.

Safety symbols (pictograms)

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

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

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

INFORMATION!
useful tips and other information

Conformity of use

1. In accordance with the current state of the art and recognized technical safety regulations, the OptiFeed PP06 is designed exclusively for use in standard powder coating applications.

2. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. If the OptiFeed PP06 powder pump is to be used for other purposes or other substances outside our specifications, Gema Switzerland GmbH must be consulted.

3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of
conformity of use. The OptiFeed PP06 powder pump should only be used, maintained and started up by trained personnel who are informed of and are familiar with the possible hazards involved.

4. The machine must not be commissioned (i.e., normal operation should not commence) until it has been established that the OptiFeed PP06 powder pump has been set up and wired in accordance with the Machinery Directive (2006/42 EC).

5. EN 60204-1 (machine safety) must also be observed.

6. Unauthorized modifications to the OptiFeed PP06 powder pump exempt the manufacturer from any liability from resulting damage.

7. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.

8. Furthermore, the country-specific safety regulations also must be observed.

<table>
<thead>
<tr>
<th>Explosion protection</th>
<th>Protection type</th>
<th>Temperature class</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE  Ex II 3 D</td>
<td>IP54</td>
<td>T6</td>
</tr>
</tbody>
</table>

Product-specific safety measures

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

OptiFeed PP06 powder pump

The OptiFeed PP06 powder pump is a constituent part of the equipment and is therefore integrated into the equipment safety system.

For the use outside of the safety concept, corresponding measures must be taken.

Note:
For further security information, see the detailed Gema safety regulations!
About these operating instructions

General information

This operating manual contains all the important information you will need to work with the OptiFeed PP06 powder pump. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components – booth, gun control unit, gun or powder injector – can be found in the supplied documents.

DANGER:

Working without operating instructions

Working without operating instructions or with individual pages from the operating instructions may result in damage to property and personal injury if relevant safety information is not observed.

► Before working with the device, organize the required documents and read the section "Safety regulations".
► Work should only be carried out in accordance with the instructions of the relevant documents.
► Always work with the complete original document.

Software version

This document describes the operation of the OptiFeed PP06 Powder pump, with software version starting from 1.13!
Product description

Field of application

**OptiFeed PP06 powder pump**

The OptiFeed PP06 Powder pump is intended for conveying coating powder (also enamel powder). Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions.

The OptiFeed PP06 Powder pump is suitable both for conveying fresh powder to automatic coating equipment and for general conveying of coating powders from powder hoppers.
Utilization

The OptiFeed PP06 type power pump is designed to gently transport large quantities of powder, even over relatively large distances.

Conveyance
- Gentle conveyance of coating powders

Cleaning
- Powder hose emptying - prevents unintentional clogging
- Powder hose rinsing (two different programs) and filter element cleaning - makes the color change process more effective

Control
- Reception and processing of signals by the higher-level control (a PLC, for example)
- Processing of signals from a level sensor
- Control of a single-phase vibration motor (with the external power supply unit only)
- Maintenance interval monitoring - indicates upcoming maintenance
- Keyboard lock - prevents an unintentional manual intervention.
- Fluidization connection
- Connection for electric conveyance pressure monitoring
- Cyclical conveyance

Note:
The functions can be controlled manually or by a higher-level external control unit!

Reasonably foreseeable misuse
- Use of moist powder
- Insufficient fluidization at the suction point
- Operation without the proper training
### Technical data

#### Powder output (guide values)

<table>
<thead>
<tr>
<th>OptiFeed PP06 powder pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose length up to 8 m</td>
<td>5 kg/min</td>
</tr>
<tr>
<td>Hose length 8-16 m</td>
<td>4 kg/min</td>
</tr>
<tr>
<td>Hose length 16-25 m</td>
<td>3.5 kg/min</td>
</tr>
</tbody>
</table>

#### Electrical data

<table>
<thead>
<tr>
<th>OptiFeed PP06 powder pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal input voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Connected load</td>
<td>20 W</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP54</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0°C - +40°C (+32°F - +104°F)</td>
</tr>
<tr>
<td>Temperature class</td>
<td>T6</td>
</tr>
</tbody>
</table>

#### External power supply unit (option)

<table>
<thead>
<tr>
<th>External power supply unit (option)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal input voltage</td>
<td>110/230 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Output</td>
<td>20 VA (without AUX)</td>
</tr>
<tr>
<td>AUX power input</td>
<td>100 VA</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP54</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0°C - +40°C (+32°F - +104°F)</td>
</tr>
<tr>
<td>Temperature class</td>
<td>T6</td>
</tr>
</tbody>
</table>

#### Pneumatic data

<table>
<thead>
<tr>
<th>OptiFeed PP06 powder pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air main connection</td>
<td>Quick release connection - 8 mm</td>
</tr>
<tr>
<td>Max. input pressure</td>
<td>8 bar</td>
</tr>
<tr>
<td>Min. input pressure</td>
<td>6 bar</td>
</tr>
<tr>
<td>Max. water vapor content of the compressed air</td>
<td>1.3 g/m³</td>
</tr>
<tr>
<td>Max. oil vapor content of the compressed air</td>
<td>0.1 mg/m³</td>
</tr>
<tr>
<td>Max. compressed air consumption during conveyance</td>
<td>12 Nm³/h</td>
</tr>
</tbody>
</table>
Dimensions

<table>
<thead>
<tr>
<th>OptiFeed PP06 powder pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>255 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>215 mm</td>
</tr>
<tr>
<td>Height</td>
<td>approx. 855 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>13.5 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External power supply unit (option)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>140 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>220 mm</td>
</tr>
<tr>
<td>Height</td>
<td>200 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>2.8 kg</td>
</tr>
</tbody>
</table>

Processible powders

<table>
<thead>
<tr>
<th>OptiFeed PP06 powder pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic powder</td>
<td>yes</td>
</tr>
<tr>
<td>Metallic powder</td>
<td>yes</td>
</tr>
<tr>
<td>Enamel powder (continuous duty)</td>
<td>OptiFeed PP06-E only</td>
</tr>
</tbody>
</table>

Sound pressure level

<table>
<thead>
<tr>
<th>OptiFeed PP06 powder pump</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal operation</td>
<td>&lt; 55 dB(A)</td>
</tr>
<tr>
<td>Cleaning operation mode</td>
<td>&lt; 67 dB(A)</td>
</tr>
</tbody>
</table>

The sound pressure level was measured while the unit was in operation; measurements were taken at the most frequent operator positions and at a height of 1.7 m from the ground.

The specified value is applicable only for the powder pump itself and does not take into account external noise sources.

The sound pressure level may vary, depending on the powder pump configuration and space constraints.
Rating plate

NOTE:
Fields with a gray background contain contract-specific data!
Design and function

General view

1 Connections
2 Operating elements
3 Compressed air indicators
4 Pressure regulator
5 Conveyance side connection
6 Powder chambers with filter elements
7 Suction side connection
8 Pinch valve

Compressed air indicators

VACUUM  Suction vacuum
CONV. AIR  Conveying air
CHECK  Process monitoring
Operating elements

**LEDs and input keys**

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>ON key</td>
</tr>
<tr>
<td>T2</td>
<td>OFF key</td>
</tr>
<tr>
<td>T3</td>
<td>Rinse key</td>
</tr>
<tr>
<td>T4</td>
<td>Rinse direction change key</td>
</tr>
<tr>
<td>T5</td>
<td>Pump key</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1*</td>
<td>ON / Programming mode / Remote operation indicator</td>
</tr>
<tr>
<td>L2*</td>
<td>Maintenance interval indicator</td>
</tr>
<tr>
<td>L3</td>
<td>Timer function indicator</td>
</tr>
<tr>
<td>L4</td>
<td>After-conveying indicator</td>
</tr>
<tr>
<td>L5</td>
<td>Rinse program 1 indicator</td>
</tr>
<tr>
<td>L6</td>
<td>Rinse program 2 indicator</td>
</tr>
<tr>
<td>L7, L8</td>
<td>Rinse direction indicator</td>
</tr>
<tr>
<td>L9, L10</td>
<td>Conveying direction indicator</td>
</tr>
</tbody>
</table>

* Multiple color display
**Pressure regulator**

1. Pressure regulator for adjusting the suction vacuum (VACUUM)
2. Pressure regulator for adjusting the conveying air (CONV. AIR)

**Connections**

**Compressed air hoses (connections)**

1. IN connection for compressed air supply
2. Connection 6.4 for fluidization (if necessary)
3. Connection 6.5 for pressure sensor (if necessary)

**Powder hoses (connections)**

A 16/23 mm-diameter powder hose is connection to the suction side and to the conveyance side.
Cables (connection and connection assignment)

Mains/PLC 2.1 connection

1. +24 VDC
2. Pumps (see also section titled “Special functions”)
3. Rinsing
4. +24 VDC output (max. load 100 mA)
5. Keyboard lock
6. Ground
PE  PE grounding

Level sensor 2.2 connection

1. Ground
2. +24 VDC level sensor
3. Signal (inverted)
PE  PE grounding
OptiFeed PP06 powder pump – internal design

A  Suction side
B  Conveyance side

1  Pneumatic group
2  Pump control unit
3  Pressure regulator for pinch valves

Scope of delivery
- One OptiFeed PP06 Powder pump
- Connecting cable, 5 m
- Parts set (grounding cables, hose clamps, fuses)
- Quick-start guide and operating instructions

Available accessories
- Power supply unit with vibrator connection (110/230 VAC - 24 VDC)
- Retrofit set for fluid suction units
- LM02 level sensor with connecting cable
- Pressure sensor
- Hose connection for fluid suction units
**Principle of operation**

**Suction procedure**

In powder chamber 1, a vacuum (negative pressure) is produced. This vacuum aspirates the coating powder in the powder chamber. A fine-porous filter element (1) in the powder chamber separates the powder. The powder chamber is closed at the output side by a pinch valve (2).

**Conveying procedure**

The pinch valve (3) on the input side of the powder chamber 2 is closed, the pinch valve (4) on the output side is opened. The coating powder is pressed out of the powder chamber by overpressure, which is created with compressed air by the fine-porous filter element, and continued to convey.

The suction and the conveying procedure alternate between both powder chambers.

---

*OptiFeed PP06 Powder pump – principle of operation*
### Conveying direction

The conveying direction of the OptiFeed PP06 powder pump is factory-preset in the direction of the arrow (see picture). If the powder pump has to convey in the other direction, the conveying direction can be changed. To learn how to change the conveying direction, refer to the section titled “Initial start-up.”

**Note:**

If the powder pump is positioned vertically, the factory-defined conveying direction must be set (suction side up/conveyance side down)!

### Powder hose emptying/after-conveying

The after-conveying avoids powder accumulations and cloggings in the powder hose. If the after-conveying is activated, after terminating the pump procedure, a few predefined pumping cycles will be executed without aspirating powder (recommended for powder tube lengths of over 2 m). The after-conveying is activated by factory. To learn how to change the after-conveying, refer to the section titled “Initial start-up.”

### Powder hose rinsing

The powder hose rinsing enables the cleaning of the powder hoses and the filter elements in the powder pump. When changing colors, rinse the unit in both the conveying direction and the suction direction.

**Changing the direction of powder hose rinsing**

The direction of powder hose rinsing can be reversed manually or automatically. See "Programming parameters."

**Manual rinsing**

This function is initiated manually. Rinsing takes place in the conveying direction or suction direction only.
**Automatic rinsing**

When the automatic rinsing function is activated by an external control unit (Control/PLC), the powder pump is rinsed automatically according to the rinse program setting.

Two rinse programs are available:

- **Rinse program 1** (factory-default rinsing of both powder chambers)

  **Note:**
  An additional external source of compressed air is mandatory for rinsing with rinse program 1! Such a source is provided if the PP06 comes supplied as part of a Gema system!

- **Rinse program 2** (rinsing in the suction direction or ).

**Level sensor signal delay**

If the switching signal of a connected level sensor is applied, the conveying procedure is switched on with a delay to prevent the powder pump from switching on and off continuously.

The internal delay can be deactivated in the pump control (see “Programming parameters”).

**Maintenance interval monitoring**

In order to offer assistance to the user, the OptiFeed PP06 powder pump indicates an upcoming maintenance. An orange LED 🔄 indicates maintenance is due. This does not affect the function of the OptiFeed PP06 powder pump!

A red LED 🛑 means the pump should be serviced as soon as possible (see “Maintenance”).

**Resetting the maintenance interval monitoring**

After the maintenance has been carried out, the maintenance interval monitoring can be reset (see "Maintenance").

**Timer function**

To prolong the service life of the pump parts, the pump should not be allowed to run continually in conveying mode. The timer function allows specific ON times and time periods to be programmed. This application is recommended especially when conveying used powder or waste powder.

See "Programming parameters."
Powder fluidization

The OptiFeed PP06 powder pump is equipped with a fluid connection (6.5). The air can be used to fluidize the powder in a fluidized powder hopper or it can be used locally for a fluid suction unit.

Note:
The equipment required for this can be ordered in consultation with Gema Customer Service.
Start-up

Preparation for start-up

Basic conditions

By the start-up of the OptiFeed PP06 Powder pump, the following basic conditions, which have an influence on the powder transport, must be considered:

- Length and height difference of the suction distance
- Length of the conveying distance
- Powder preparation and powder quality

The basics (preparation)

By following the basic principles below, you will be able to successfully start up your OptiFeed PP06 powder pump:

- Keep the suction distance as short as possible.
- At the suction area, ensure homogeneous fluidization so that no air pockets (craters) can be formed.
- Basically, the powder transport with the OptiFeed PP06 powder pump works with every powder type that can be fluidized. If the powder is, for example, humid or contaminated with other materials, then the conveying can be negatively influenced or may not work at all.
Set-up

The pump is used to convey fresh powder as well as recovered powder or waste powder.

The OptiFeed PP06 powder pump should always be mounted vertically.

NOTE!
A horizontal position will result in poor powder conveying performance.

WARNING:
The pump must not under any circumstances be set up near a heat source (such as an enameling furnace) or an electromagnetic source (such as a control cabinet).

Assembly guide

The OptiFeed PP06 powder pump is mounted with 4 M6 screws on the back.
Connection possibilities

**Connection via the Mains/PLC 2.1 connection**

The OptiFeed PP06 powder pump is powered with an operating voltage of 24 VDC via the **Mains/PLC 2.1** connection.

**Connecting the external power supply unit**

If the OptiFeed PP06 is used as a standalone unit or together with a vibration motor, the corresponding (optionally available) external power supply must be connected to the **Mains/PLC 2.1** connection.

**Connecting a level sensor**

By connecting a level sensor on **Level Sensor 2.2**, the powder container level can be controlled with the powder pump.

If a level sensor is connected, a wake time can be activated/deactivated in the powder pump control unit. This wake time effects the after-conveying for 3 secs. after the achievement of the sensor switching point. This prevents the permanent switching on and off of the powder pump.

**Level sensor connecting cable**

A level sensor connecting cable is optionally available (see spare parts list).
Connecting the OptiFeed PP06 powder pump

As delivered by the manufacturer, the PP06 powder pump is ready for operation. Just a few cables and hoses must be connected.

The start-up takes place, depending on the powder pump control unit, according to following steps:

1. Connect the powder hoses to the powder pump input and output (default setting: output side down).

Note:
The powder pump parameters are preset at the factory (rinse program, and after-conveying)!
▸ The "Programming parameters" section describes how to change these parameters!

2. Connect the fluidization to the connection 6.4 (if necessary)

3. Connect the compressed air supply to the IN Air Supply connection.

4. Connect the supplied grounding cable to the pump ground connection and to an appropriate grounding point.

5. Connect the level sensor to the Level Sensor 2.2 connection (if necessary).

6. Connect the operating voltage via Mains/PLC 2.1.

Note:
If a vibration motor is used, it must be connected to the external power supply!

Warning:
Any unused electrical and pneumatic connections must be closed off. The sealing caps are in place when the unit is delivered!
Initial start-up

NOTE!
The most recent settings are retained every time the powder pump is switched on.

Programming parameters

Conveying direction

The conveying direction of the OptiFeed PP06 powder pump is factory-preset in the direction of the arrow (see picture). To change the, follow these steps:

1. Press 🎁 🤔 for 5 seconds 🌈 💡 lights up orange
2. Press 🎁 📈 and 🍃 flash*, 🌧️ lights up orange
3. Press 🎁 🍃 and 🍃 flash*, 🌧️ lights up orange
4. Press 🎁 🤔 🍃 lights up green

* Factory setting
** This symbol can light up either orange or red (depending on the status of the operating time).
Direction of powder hose rinsing

The powder hose rinsing of the OptiFeed PP06 powder pump is factory-preset in the (direction of the arrow; see picture). To change the rinse direction, follow these steps:

1. Press for 5 seconds
   - flashes, lights up orange

2. Press and flash*, lights up orange

3. Press and flash*, lights up orange

4. Press
   - lights up green

* Factory setting
** This symbol can light up either orange or red (depending on the status of the operating time).

After-conveying

The after-conveying function of the OptiFeed PP06 powder pumps is activated in the factory setting.

To disable this function, follow these steps:

1. Press for 5 seconds
   - goes dark

To activate this function, follow these steps:

2. Press for 5 seconds
   - lights up
**After-conveying length**

The after-conveying length is defined by the number of programmable cycles based on the hose length. The factory setting for the pump is 8 cycles.

These cycles are indicated by the corresponding LED when programmed:

- ▲ = 8 cycles (for powder hoses 2 m and longer)
- ▼ = 16 cycles (for powder hoses 25 m and longer)

1. Press ▼ for 5 seconds
   - lights up orange
   - lights up

2. Press ▲
   - and ▼ flash

3. Press ▲
   - and ▼ flash

4. Press ▼
   - lights up green

**Setting the rinse program**

When the automatic rinsing function is activated by an external control unit (Control/PLC), the powder pump is rinsed automatically according to the rinse program setting.

Two rinse programs are available:

- Rinse program 1 (factory-default rinsing of both powder chambers)
- Rinse program 2 (rinsing in the suction direction or conveying direction).

**Changing the rinse program**

1. Press ▼ for 5 seconds
   - lights up orange
   - lights up

2. Press ▲
   - flashes

3. Press ▲
   - flashes

4. Press ▼
   - lights up green
Level sensor delay

The internal delay is deactivated in the pump control as follows:

1. Press for 5 seconds and flash

The internal delay is activated in the pump control as follows:

2. Press for 5 seconds and flash

Timer function

Switching on

The timer function of the OptiFeed PP06 powder pump is deactivated in the factory settings. To activate this function, follow these steps:

1. Press for 5 seconds lights up

The timer function is deactivated in the pump control as follows:

2. Press for 5 seconds goes dark
Setting the time period and ON time

<table>
<thead>
<tr>
<th>Period</th>
<th>No. 1</th>
<th>No. 2</th>
<th>No. 3</th>
<th>No. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 min.</td>
<td>20 sec.</td>
<td>30 sec.</td>
<td>40 sec.</td>
<td>50 sec.</td>
</tr>
<tr>
<td>6 min.</td>
<td>1 min.</td>
<td>2 min.</td>
<td>3 min.</td>
<td>4 min.</td>
</tr>
<tr>
<td>60 min.</td>
<td>2 min.</td>
<td>4 min.</td>
<td>6 min.</td>
<td>8 min.</td>
</tr>
</tbody>
</table>

1. Press for 5 seconds, lights up orange flashes
2. Press, L9 flashes = period: 1 minute
3. Press, L10 flashes = period: 6 minutes
4. Press, L8 flashes = period: 60 minutes
5. Press, L9 flashes = ON time 1
6. Press, L10 flashes = ON time 2
7. Press, L8 flashes = ON time 3
8. Press, L7 flashes = ON time 4
9. Press

Restoring default values

1. Press OFF
2. Press and hold, All LEDs light up
3. Press ON
4. Press and hold 5 seconds, Only the LEDs for the factory-preset functions light up
Note:
When installing or operating the pump for the first time, it is recommended to carry out a function check without powder!

Switching on the PP06 powder pump

The powder pump is switch on or off by pressing the **ON** key.

The **LED** lights up green. The powder pump is ready for operation.

Manually starting the conveying procedure

Press **flashes**

The conveying procedure begins in the programmed conveying direction.

Manually stopping the conveying procedure

Press **flashes more quickly**

* Only if after-conveying is activated; otherwise, this LED lights up steady.

The conveying procedure is stopped.

When after-conveying is activated, the hose is emptied as it exits the pump (see section titled "Typical properties"). The LED first flashes more quickly, then lights up steady once the after-conveying procedure is finished.

* This is the factory-set conveying direction. The "Programming parameters" section describes how to change the conveying direction.

Manually starting the rinse procedure

Press **flashes**

The rinse procedure begins in the programmed rinse direction.

Manually reversing the rinse direction

Press **flashes**

The rinse direction can be reversed at any time during the rinse procedure.
Manually stopping the rinse procedure

Press ➤ lights up*  
* This is the factory-set rinse direction. The "Programming parameters" section describes how to change the rinse direction.

Setting the suction and conveying parameters

Two pressure controllers are used to make these settings: VACUUM and CONV. AIR.

Setting the suction vacuum (VACUUM)

The required suction vacuum is set using the VACUUM pressure controller. The factory setting is 3 bar. Here are some recommended guide values:

<table>
<thead>
<tr>
<th>Setting (bar)</th>
<th>Height difference (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>0-1</td>
</tr>
<tr>
<td>3.0</td>
<td>2</td>
</tr>
<tr>
<td>4.0</td>
<td>3</td>
</tr>
</tbody>
</table>

Setting the conveying air (CONV. AIR)

The conveying air is set using the CONV. AIR pressure controller. The factory setting is 3 bar.

Recommendation:
- Do not fall below 2 bar, this can lead to cloggings
- Do not exceed 5 bar, if possible

<table>
<thead>
<tr>
<th>Setting (bar)</th>
<th>Hose length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>up to 2</td>
</tr>
<tr>
<td>3.0</td>
<td>2-8</td>
</tr>
<tr>
<td>4.0</td>
<td>8-16</td>
</tr>
<tr>
<td>5.0</td>
<td>more than 16</td>
</tr>
</tbody>
</table>
Guide values for the conveying adjustment

<table>
<thead>
<tr>
<th>Suction distance [m]</th>
<th>Conveying distance [m]</th>
<th>VACUUM [bar]</th>
<th>CONV. AIR [bar]</th>
<th>Powder hose emptying/after-conveying activated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>yes, recommended</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>2</td>
<td>5</td>
<td>yes, recommended</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>yes, recommended</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>4</td>
<td>5</td>
<td>yes, recommended</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>not necessary</td>
</tr>
</tbody>
</table>

Procedure monitoring (CHECK)

The CHECK pressure gauge enables the procedure monitoring. If the powder hose tends to clogging, then the pressure increases noticeably!

Note:

When the unit is operating properly, i.e., powder is being supplied to the pump normally, a pressure peak between 0.3-1.0 bar should be generated!

► During the pumping process, the pressure may not exceed 1 bar!
External control

Externally starting and stopping the conveying procedure

When the conveying procedure is started with external control, the ▼ indicator flashes, and the □ indicator lights up red.

The conveying procedure is ended by shutting off the external Pump signal.

When after-conveying is activated, the hose is emptied as it exits the pump (see section titled “Typical properties”). The ▼ LED first flashes more quickly, then lights up steady once the after-conveying procedure is finished.

Externally switching the rinsing procedure on and off

Rinse program 1

When rinse program 1 is started with external control, the ▼▲ indicators both flash at the same time, and the □ indicator lights up red.

The rinse procedure is ended by shutting off the external Rinse signal.

Rinse program 2

When rinse program 2 is started with external control, the ▼ and ▲ indicators flash alternatingly for a specific time, and the □ indicator lights up red.

The rinse procedure is ended by shutting off the external Rinse signal.

External control with level sensor

If the connected level sensor signals a lack of powder, the powder pump starts up either with a delay (by default) or immediately. The corresponding LED flashes during the delay time.

Note:
This delay can be deactivated (see section ”LM02 Level sensor delay”).
## External control – summary

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumping</td>
<td>0 1 x 0</td>
</tr>
<tr>
<td>Rinsing</td>
<td>1 0 x 0</td>
</tr>
<tr>
<td>Keyboard lock</td>
<td>1 0 x 0</td>
</tr>
<tr>
<td>Level sensor</td>
<td>0 1 x 0</td>
</tr>
</tbody>
</table>

### Start-up

The OptiFeed PP06 powder pump is started up for manual operation following these steps:

1. Ensure the grounding
2. Prepare the compressed air (6-8 bar)
3. Connect the 24 VDC electrical power supply (if using the vibrator: 110-230 VAC for the external power supply unit)
4. Switch on the OptiFeed PP06 Powder pump
5. Check the configuration of the pump control (see "Programming parameters")
6. Adjust the setting parameters for the suction procedure, suction distance, and height (see also section "Setting the suction and conveying parameters")
7. Start the pump procedure by pressing the Pump key
8. Optimize the setting parameters for the suction and conveying procedure

### Note:
It is recommended to observe the pressure gauges of the pressure regulators. The indicators should be in the green range!

### Decommissioning

1. Switch off the OptiFeed PP06 Powder pump by pressing the OFF key, or by switching off on the external control unit.
   - The LED goes dark.
2. Cut off the compressed air supply to the powder pump!
Cleaning and maintenance

Note:
Regular, conscientious maintenance increases the service life of the OptiFeed PP06 powder pump and ensures the coating quality will remain consistent over a longer period of time!
► The parts to be replaced during maintenance work are available as spare parts. These parts can be found in the corresponding spare parts list!

Maintenance of the powder pump

The OptiFeed PP06 Powder pump is designed in such a way, that only a minimum maintenance must be carried out.

Daily maintenance
Clean the powder pump with a dry cloth and check the connection points of the powder hoses. Replace the powder hoses, if necessary.

Weekly maintenance
Rinse the powder pump in conveying direction and in suction direction by using the rinsing program. This cleans the filter elements and prevents potential, unintended powder deposits in the powder pump and in the powder hoses.
OptiFeed PP06 Powder pump – maintenance plan

The pinch valves on the OptiFeed PP06 powder pump are subject to a maintenance regime.

**Warning:**
A worn pinch valve hose, which becomes powder permeable, can damage the air valves!

**Note:**
The service life of the pinch valve hoses can be increased substantially if the timer functionality is activated!

*Filter elements*

The service life of the filter elements depends on the service duration, the powder quality and the quality of the air supply. Basically, it is recommended to replace also the filter elements by changing the pinch valves.

*Maintenance according to maintenance interval monitoring*

The OptiFeed PP06 powder pump indicates it is time for maintenance by changing the maintenance indicator from to . If the recommended operating time is exceeded, the indicator changes to .

As guide value, following operating times apply:
- 1 shift operation - after 360 days (continuous operation)
- 3 shift operation - after 120 days (continuous operation)

*Resetting the maintenance interval*

1. Press for 5 seconds

2. Press lights up

*Maintenance set*

The wearing parts to be replaced during the PP06 Powder pump maintenance are available as maintenance set (see the spare parts list). This set contains 2 filter elements, 6 fluid tubes, 8 O-rings (30 mm dia.), 4 O-rings (46 mm dia.) and 4 pinch valve hoses.
Replacing the pinch valves

Required spare parts - 4 pinch valve hoses NW15

**Disassembly:**

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12.
Assembly:

Note:
The assembly takes place in reverse order!

1. Center the sleeve.
2. Tighten the screws evenly on both sides.
Replacing the filter elements

Required spare parts - 2 filter elements / O-rings if necessary

1. 
2. 
3. 
4. 
5. 
6. 
7. 

Note:
The assembly takes place in reverse order!
Corrective action

### General information

<table>
<thead>
<tr>
<th>Fault</th>
<th>Causes</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator on pump control unit does not light up</td>
<td>No operating voltage</td>
<td>+24 VDC must be supplied at connection 2.1 PIN 1</td>
</tr>
<tr>
<td>Internal fusing is defective</td>
<td></td>
<td>Replace the defective fuse</td>
</tr>
<tr>
<td>Pump control is defective</td>
<td></td>
<td>Replace pump control or send it in for repair</td>
</tr>
<tr>
<td>and indicator on pump control unit are flashing red</td>
<td>The parameter memory test was erroneous</td>
<td>Reset to the default values: press for 5 seconds. Then set parameters, if necessary.</td>
</tr>
<tr>
<td>Powder pump is not conveying, or indicator is not flashing</td>
<td>No Pump on control signal</td>
<td>A control signal must be applied at connection 2.1 PIN 2</td>
</tr>
<tr>
<td>Powder pump is not conveying, or indicator is flashing</td>
<td>If the LEDs on the valve connectors do not light up, the pump control or corresponding valve is defective</td>
<td>Replace pump control or send it in for repair</td>
</tr>
<tr>
<td>Powder pump does not convey</td>
<td>Compressed air supply failed or pressure too low</td>
<td>Check the compressed air source (ensure an air pressure of 6-8 bar)</td>
</tr>
<tr>
<td></td>
<td>No fluidization in the suction zone</td>
<td>Ensure the fluidization</td>
</tr>
<tr>
<td></td>
<td>Conveying hose is clogged</td>
<td>Empty powder hoses over 6 m long with compressed air or manually (warning - powder will be expelled!)</td>
</tr>
<tr>
<td>Fault</td>
<td>Causes</td>
<td>Corrective action</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Suction hose is clogged</td>
<td>Run the rinse program in conveying and in suction direction (warning - powder will be expelled!)</td>
<td></td>
</tr>
<tr>
<td>Service life of the pinch valve has expired (defective)</td>
<td>Change the pinch valve, check the pneumatic system for defects and replace, if necessary</td>
<td></td>
</tr>
<tr>
<td>Powder pump is not conveying adequately</td>
<td>The conveying hose or suction hose is becoming clogged</td>
<td>Empty the powder hose with compressed air or manually (warning – powder will be expelled!)</td>
</tr>
<tr>
<td>Leaks on suction side</td>
<td>Check for leaks and reseal</td>
<td></td>
</tr>
<tr>
<td>Filter elements in the powder chambers are not permeable enough</td>
<td>Replace the filter elements</td>
<td></td>
</tr>
<tr>
<td>The filter tubes (protecting the pneumatics) are not permeable enough</td>
<td>Replace the filter tubes and check the pneumatic system for damage</td>
<td></td>
</tr>
<tr>
<td>Wrong pinch valve pressure setting</td>
<td>On the internal pressure regulator set the pinch valve pressure to 3 bar (install a pressure gauge in the pneumatic line)</td>
<td></td>
</tr>
</tbody>
</table>
Service functions

Powder hose emptying before powder supply

An external starting impulse permits a powder hose emptying before the powder supply starts. When the signal is ending, the pump stops without overtravel cycle.

Timing diagram – Control/PLC 2.1 connection

Note:
After the signal drops off (STOP) if a start pulse (100 ms ON, 100 ms OFF, then ON) is applied again within 90 seconds, the pump begins conveying powder immediately (without emptying the hose).
Schematic diagrams

OptiFeed PP06 – block diagram

OptiFeed PP06 – block diagram

Network connection? PLC

Solenoid valves

Level sensor

Ventil 1.0
Ventil 2.0
Ventil 3.0
Ventil 4.0
Ventil 5.0
Ventil 6.0

24VDC_IN
Start
Reinigen

Niveausonde

GND
24VDC
Signal

Ventil 1.0 Ventil 2.0 Ventil 3.0 Ventil 4.0 Ventil 5.0 Ventil 6.0

sw
sw
sw
sw
sw
sw

PE: Erde

24VDC_OUT

PE:Schirm

PE

GND_IN

PE

OptiFeed PP06 – block diagram
OptiFeed PP06 – pneumatic diagram
Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

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

Example:

- **Type** OptiFeed PP06 powder pump  
  **Serial number** 1234 5678  
- **Order no.** 203 386, 1 piece, Clamp – dia.18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *. The wearing parts are always marked with a #.

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

Example:

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

**WARNING:**

Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!
## OptiFeed PP06 powder pump

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pneumatic group – complete (see corresponding spare parts list)</td>
<td>1006 245</td>
</tr>
<tr>
<td>2</td>
<td>Valve board – complete (without items 2.1, 2.2, 2.3)</td>
<td>1006 540</td>
</tr>
<tr>
<td>2.1</td>
<td>Spacer sleeve – dia. 3.1/6x15 mm</td>
<td>1006 987</td>
</tr>
<tr>
<td>2.2</td>
<td>Locknut – M3</td>
<td>262 498</td>
</tr>
<tr>
<td>2.3</td>
<td>Washer – dia. 3.2/7x0.5 mm</td>
<td>201 944</td>
</tr>
<tr>
<td>3</td>
<td>Connecting cable for valves</td>
<td>1006 967</td>
</tr>
<tr>
<td>4</td>
<td>Plug cap – dia. 8 mm</td>
<td>238 023</td>
</tr>
<tr>
<td>5</td>
<td>Powder chamber – see corresponding spare parts list</td>
<td>1006 670</td>
</tr>
<tr>
<td>6</td>
<td>Filter cartridge, complete – 8-8 mm</td>
<td>1006 669</td>
</tr>
<tr>
<td>7</td>
<td>Filter cartridge, complete – 8-6 mm (not shown)</td>
<td>1006 241</td>
</tr>
<tr>
<td>8</td>
<td>Pressure regulator – 0.5-8 bar, G1/8&quot;</td>
<td>1005 827</td>
</tr>
<tr>
<td>9</td>
<td>Pressure gauge – 1 ... +9 bar - 1/8&quot;</td>
<td>206 474</td>
</tr>
<tr>
<td>10</td>
<td>Protection cap for connector socket</td>
<td>206 458</td>
</tr>
<tr>
<td>11</td>
<td>Protection cap for plug</td>
<td>1006 969</td>
</tr>
<tr>
<td>12</td>
<td>Silencer – 1/2&quot;</td>
<td>1003 651</td>
</tr>
<tr>
<td></td>
<td>Connecting cable – L=5 m (not shown)</td>
<td>1004 112</td>
</tr>
<tr>
<td></td>
<td>Connecting cable – L=30 m (not shown)</td>
<td>1003 229</td>
</tr>
<tr>
<td></td>
<td>Connecting cable for LM02 level sensor – L=6 m (not shown)</td>
<td></td>
</tr>
</tbody>
</table>
OptiFeed PP06 powder pump
## OptiFeed PP06 powder pump – pneumatic group

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>End plate</td>
<td>1006 239</td>
</tr>
<tr>
<td>2</td>
<td>Solenoid valve</td>
<td>1006 237</td>
</tr>
<tr>
<td>3</td>
<td>Supply station</td>
<td>1006 234</td>
</tr>
<tr>
<td>4</td>
<td>Solenoid valve</td>
<td>1006 236</td>
</tr>
<tr>
<td>5</td>
<td>Auxiliary station</td>
<td>1006 235</td>
</tr>
<tr>
<td>6</td>
<td>Solenoid valve</td>
<td>1006 238</td>
</tr>
<tr>
<td>7</td>
<td>End plate</td>
<td>1006 240</td>
</tr>
<tr>
<td>8</td>
<td>Precision pressure regulator – 1/8&quot;, 0.5-8 bar</td>
<td>1006 986</td>
</tr>
<tr>
<td>9</td>
<td>Silencer – dia. 12 mm</td>
<td>1006 707</td>
</tr>
<tr>
<td>10</td>
<td>Vacuum generator</td>
<td>1006 242</td>
</tr>
</tbody>
</table>
OptiFeed PP06 powder pump – pneumatic group
# OptiFeed PP06 powder pump – powder chamber

<table>
<thead>
<tr>
<th>A</th>
<th>Pinch valve – NW15 mm</th>
<th>1006 255</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hose connection – ID15</td>
<td>1003 301#</td>
</tr>
<tr>
<td>1.1</td>
<td>Hose connection – ID15 (Enamel version)</td>
<td>1006 591#</td>
</tr>
<tr>
<td>2</td>
<td>PT-screw – 50x25 mm</td>
<td>1003 558</td>
</tr>
<tr>
<td>3</td>
<td>Sleeve – NW15 mm</td>
<td>1006 256#</td>
</tr>
<tr>
<td>4</td>
<td>Elbow joint – 1/8*- 6 mm</td>
<td>265 691</td>
</tr>
<tr>
<td>5</td>
<td>Connecting nipple</td>
<td>1006 495</td>
</tr>
<tr>
<td>5.1</td>
<td>Connecting nipple (Enamel version)</td>
<td>1006 493</td>
</tr>
<tr>
<td>6</td>
<td>O-ring – Ø 30x3 mm</td>
<td>1003 533#</td>
</tr>
<tr>
<td>7</td>
<td>Cone connection – complete, incl. Pos. 8 and 9</td>
<td>1006 254</td>
</tr>
<tr>
<td>7.1</td>
<td>Cone connection (Enamel version) – complete, incl. Pos. 8 and 9</td>
<td>1007 673</td>
</tr>
<tr>
<td>8</td>
<td>O-ring – Ø 39x3 mm</td>
<td>1006 278</td>
</tr>
<tr>
<td>9</td>
<td>Allen set screw – M5x12 mm</td>
<td>1006 498</td>
</tr>
<tr>
<td>10</td>
<td>Elbow joint – 1/8*-Ø 8 mm</td>
<td>251 372</td>
</tr>
<tr>
<td>11</td>
<td>O-ring – dia. 46x1.5 mm</td>
<td>1006 279#</td>
</tr>
<tr>
<td>12</td>
<td>Jacket tube</td>
<td>1006 251</td>
</tr>
<tr>
<td>13</td>
<td>Filter element – 40/30 mm</td>
<td>1006 252#</td>
</tr>
<tr>
<td>14</td>
<td>Sealing plug – 1/8*</td>
<td>263 826</td>
</tr>
<tr>
<td>15</td>
<td>Countersunk head screw – M5x10 mm</td>
<td>214 671</td>
</tr>
<tr>
<td>16</td>
<td>Y-piece</td>
<td>1006 962</td>
</tr>
<tr>
<td>17</td>
<td>Powder hose – Ø 16/23 mm</td>
<td>1010 040*#</td>
</tr>
<tr>
<td>17.1</td>
<td>Powder hose – Ø 16/23 mm (Enamel version)</td>
<td>1008 087*#</td>
</tr>
<tr>
<td>18</td>
<td>Hose clamp 17-25 mm</td>
<td>223 085</td>
</tr>
<tr>
<td>19</td>
<td>Grounding cable – complete</td>
<td>1006 990</td>
</tr>
<tr>
<td>20</td>
<td>Allen cylinder screw – M6x10 mm</td>
<td>216 399</td>
</tr>
<tr>
<td>21</td>
<td>Fan-shaped washer – A-type, M6</td>
<td>216 054</td>
</tr>
<tr>
<td>22</td>
<td>Cap screw – M5x12 mm</td>
<td>239 941</td>
</tr>
<tr>
<td>23</td>
<td>Fan-shaped washer – A-type, M5</td>
<td>231 045</td>
</tr>
<tr>
<td>24</td>
<td>O-ring – dia. 32x1.5 mm</td>
<td>1006 264#</td>
</tr>
</tbody>
</table>

* Maintenance set for PP06 powder pump (not shown) | 1006 267 |

* Please indicate length

# Wearing part
OptiFeed PP06 powder pump – powder chamber