

Precision particle feeder Operating manual

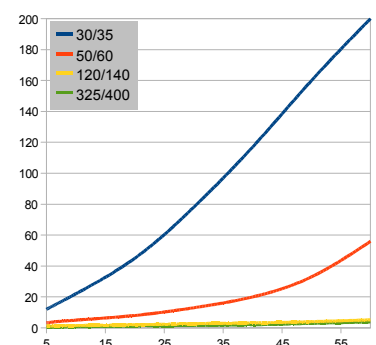
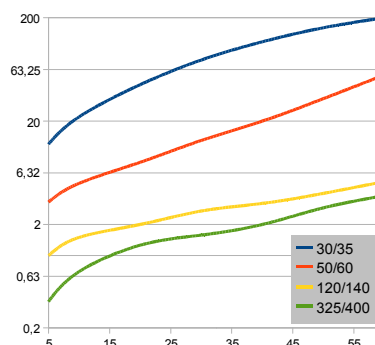
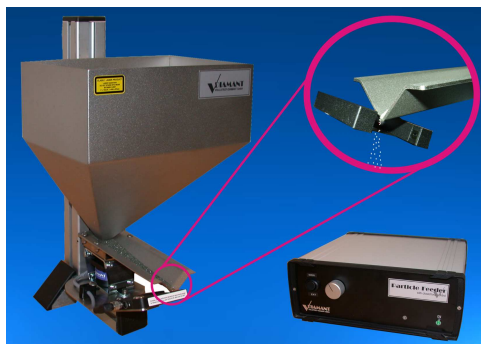


Technical data:

The new control principle with microcontroller and laser slot sensor guarantees stable and reproducible particle feed rates. The powder feed rate is depend on the grain size. The feed rate can be set by analog input, potentiometer on the front of the controller or the RS232 interface.

Features:

- Adjustable output particle feed rate
- Useful for powder grain size from 400 to 16 Mesh
- independent of mains frequency, mains fluctuations, system angle and load
- laser controlled regulation system
- RS232 reply with “feeder empty” or “feeder full” status signal



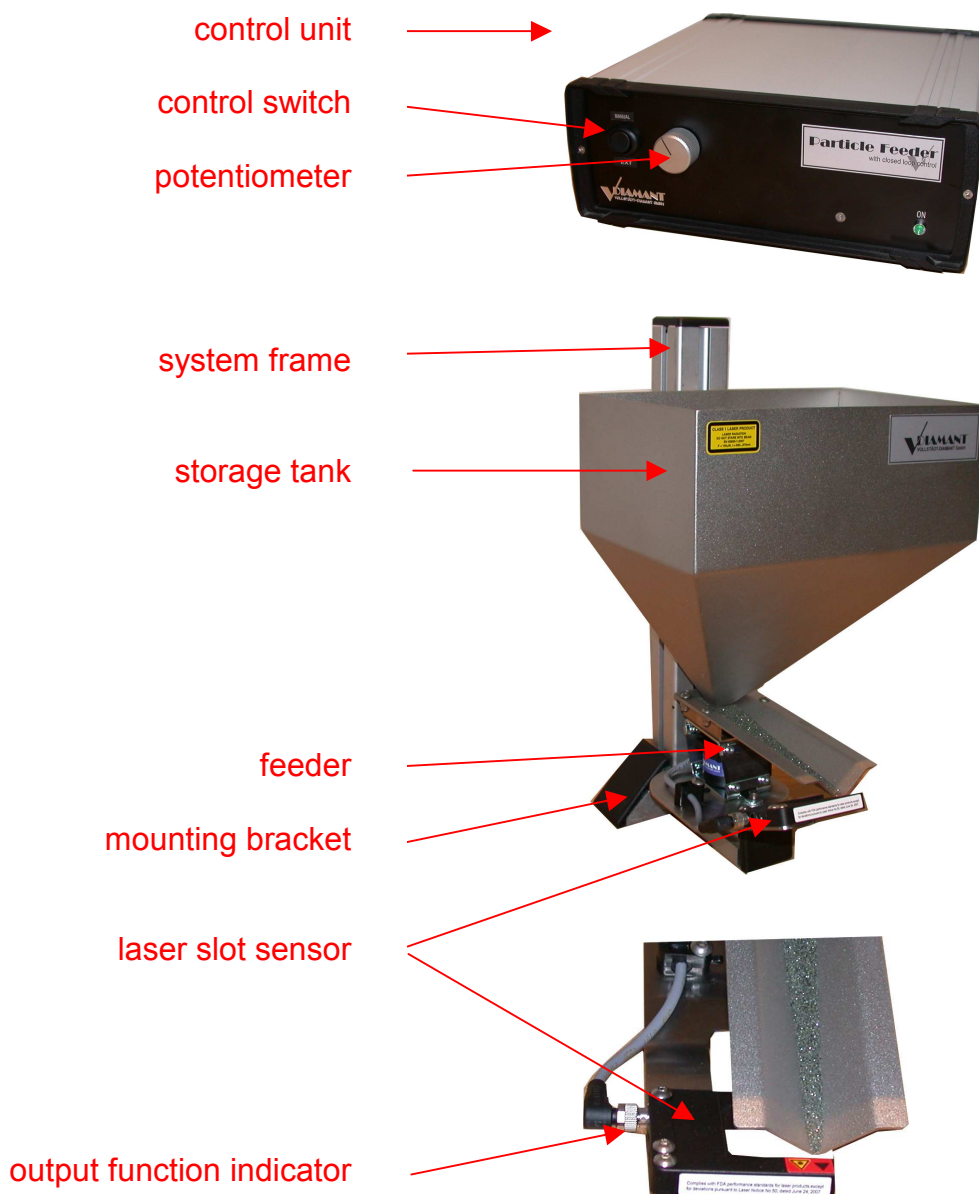
| | | |
|----------------------|---|-------------------------------------------------|
| power supply | : | 100 ... 130 V or 200V ... 240V 50/60 Hz (fixed) |
| external set point | : | 0...10 V , Potentiometer 10 k, or RS232 |
| regulation principle | : | Microcontroller with Laser Slot Sensor, |
| particle throughput | : | app. 1000... 200000 particles per minute |
| feed range approx. | : | 10 ... 200 ct./min (30/35 mesh) |
| | : | 3 ... 60 ct./min (50/60 mesh) |
| | : | 0.5 .. 4 ct./min (325/400 mesh) |
| dimensions | : | 350 x 200 x 250mm |
| weight | : | approx. 2,4 kg |
| reservoir volume | : | approx. 3,5 l |

Working principle:

A charging hopper holds up to 3 litres of powder. An opening at the bottom of the hopper lets the powder out onto a vibration feeder. The powder stream leaving the vibration feeder passes a laser slot sensor which acts as a light barrier. The laser sensor is sensitive enough to detect single particles. The number of particles passing the laser sensor per unit of time is compared in the microcontroller with the desired feed rate. The microcontroller adjusts the vibration amplitude of the feeder according to the comparison result. After a few seconds settling time the feed rate will be stable.

Main components:

The particle feeder consists of the following components:



Setting the feed rate:

The feed rate can be adjusted in three different ways:

1. Potentiometer knob at the front panel (switch set to MANUAL)
2. analog voltage 0..10V at the rear connector (switch set to EXT)
3. digital serial command from a PLC or PC (the first received command sentence via the RS232 interface supersedes MANUAL or EXT settings, until the next power up only serial commands will influence the feeder).



CONTROL SWITCH

POTENTIOMETER

POWER ON LED

Serial command format:

The serial RS232 interface works at the following port settings:

9600 bd
8 bit
no parity
1 stopbit

The command has the format ">>setvalue", where setvalue is a one byte value ranging from 1 .. 255 (01h .. FFh). Here ">" is the ASCII representation for 3Eh . The 3 byte hexadecimal command sequence to set a feedrate of 45 will be 3Eh 3Eh 2Dh.

If the controller has received a correct command sequence it will answer with the status of the feeder, the answer is one byte long (there is no CR or CRLF added!):

ASCII "F" (45h) for "feeder full"
ASCII "E" (46h) for "feeder empty"

The "feeder empty" status will be sent, if there was no particle passing the laser for a longer time (approx. 2 minutes)

Please note:

The design of the particle feeder ensures a stable and reproducible feeding rate with respect to particles per unit of time. The particle mass per unit of time depends on the grain size! Also the grain shape will influence the realised feed rates. As the laser beam covers only a subsection of the material flow the feed rate is sensitive to the position of the laser beam inside the flow of falling particles. **Different particle feeders are likely to give stable, but slightly different feed rates at the same setpoint.**

The feedrate is limited to values where the laser can distinguish between separate particles. If the particles begin to overlap each other in the laser beam saturation has been reached. The saturation point is dependent on the exact location of the laser beam in the material flow.

Special settings of the feed rate:

There are two regions in the value space for the feedrate setpoint which will cause special actions of the feeder. These actions are

| | |
|----------------------------------|-------------------------|
| FEEDER OFF (serial command only) | at setpoint value of 1 |
| FIXED FEEDER AMPLITUDE ON | at setpoint values >200 |

At setpoint values in the range 201 ... 255 the amplitude of the vibration feeder is set to 80 ... 100% of the maximum amplitude.

Electrical Connections:

CAUTION: Check to insure that all electrical connections and voltage requirements are in agreement with the electrical schematic prior to energizing device.

This device is designed for operation on: (Input voltage by customer)

| | | | |
|---------|---|-----------|----------------|
| Voltage | : | 120 V, AC | (Single phase) |
| Cycles | : | 50/60 Hz | |

The machines requires a properly earthed wall outlet with protective ground connector!

Connect the particle feeder with the control unit

CH1: feeder

CH2: laser slot sensor

CH3: Externe analog voltage

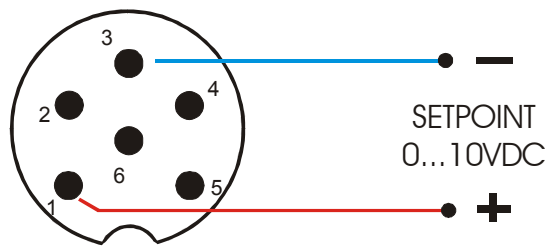
CH4: not required



connections on the control unit

Externe analog voltage CH3:

Lumberg Sv60



Maintenance

Keep the machine clean, the storage container and the feeders. Use alcohol for cleaning of the metallic surfaces. Never use water! Shut down and unplug the machine before cleaning. If the output function indicator from the laser slot sensor always on then you must clean it.

Safety instructions

Protect yourself and your environment against danger of accidents by suitable precautions and follow the following hints in your own interest.



WARNING:

This device must be operated and maintained only by instructed persons. The operator has to ensure appropriate operation
At all maintenance- and repair works: before starting to work always pull out the power plug.



WARNING:

When the device is working , do not put your hands between the feeding parts.



WARNING:

LASER protection regulations:

Danger of eye injury. Do not look into the laser beam! The device should be installed so that the laser warning label is easily visible. Laser protection regulations: The transmitter and the laser light barrier comply with laser class 1 in accordance with DIN EN 60825-1:2003-10. Therefore no additional protective measures are necessary for operation. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated Jun 24, 2007.

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