

Operating Instructions Manual

ProMinent® gamma/ L Solenoid Dosing Pump



Please affix nameplate here!

**Please read the operating instructions through completely before commissioning this equipment! Do not discard!
Any part which has been subject to misuse is excluded from the warranty!**

Printing:

Operating Instructions ProMinent® gamma/ L
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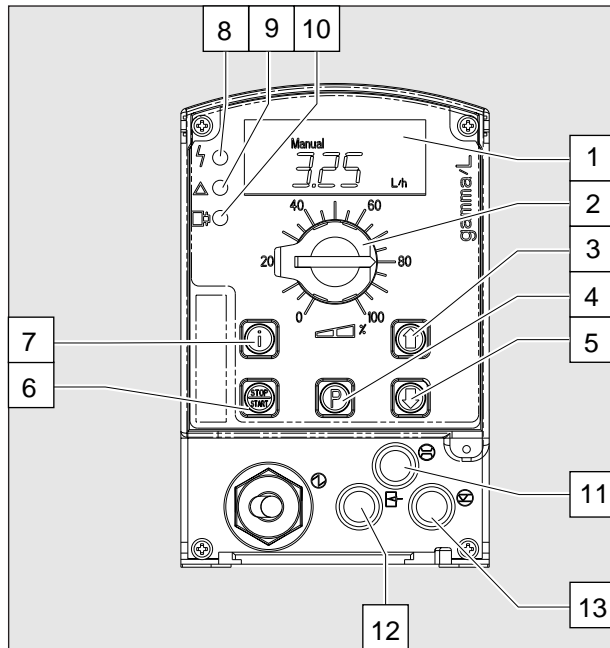
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Subject to technical alteration.

Control elements and key functions

Control elements: overview



- 1 LCD display
- 2 Stroke length adjusting knob
- 3 UP key
- 4 P key
- 5 DOWN key
- 6 STOP/START key
- 7 i key
- 8 Fault indicator (red)
- 9 Warning indicator (yellow)
- 10 Operating indicator (green)
- 11 "Dosing monitor" terminal
- 12 "External control" terminal
- 13 "Float switch" terminal

Key functions

In continuous display mode (operating)

In settings mode (settings)

STOP/START key



Press briefly

Stop pump,
start pump

Stop pump,
start pump

P key



Press briefly

Start batch (in "batch" operating mode only),
Cancel error

Confirm entry- jump to next menu
option or continuous display

Press for 2 s

Change to settings mode

Press for 3 s

Jump to continuous display

Press for 15 s

Load factory settings (calibration)

i key



Press x1

Toggle between continuous displays

Toggle between "change individual digits"
and change a figure"

Press x2

For "change individual digits":
jumps to first digit

Arrow keys UP and DOWN



Press x1
(until "Set" appears)

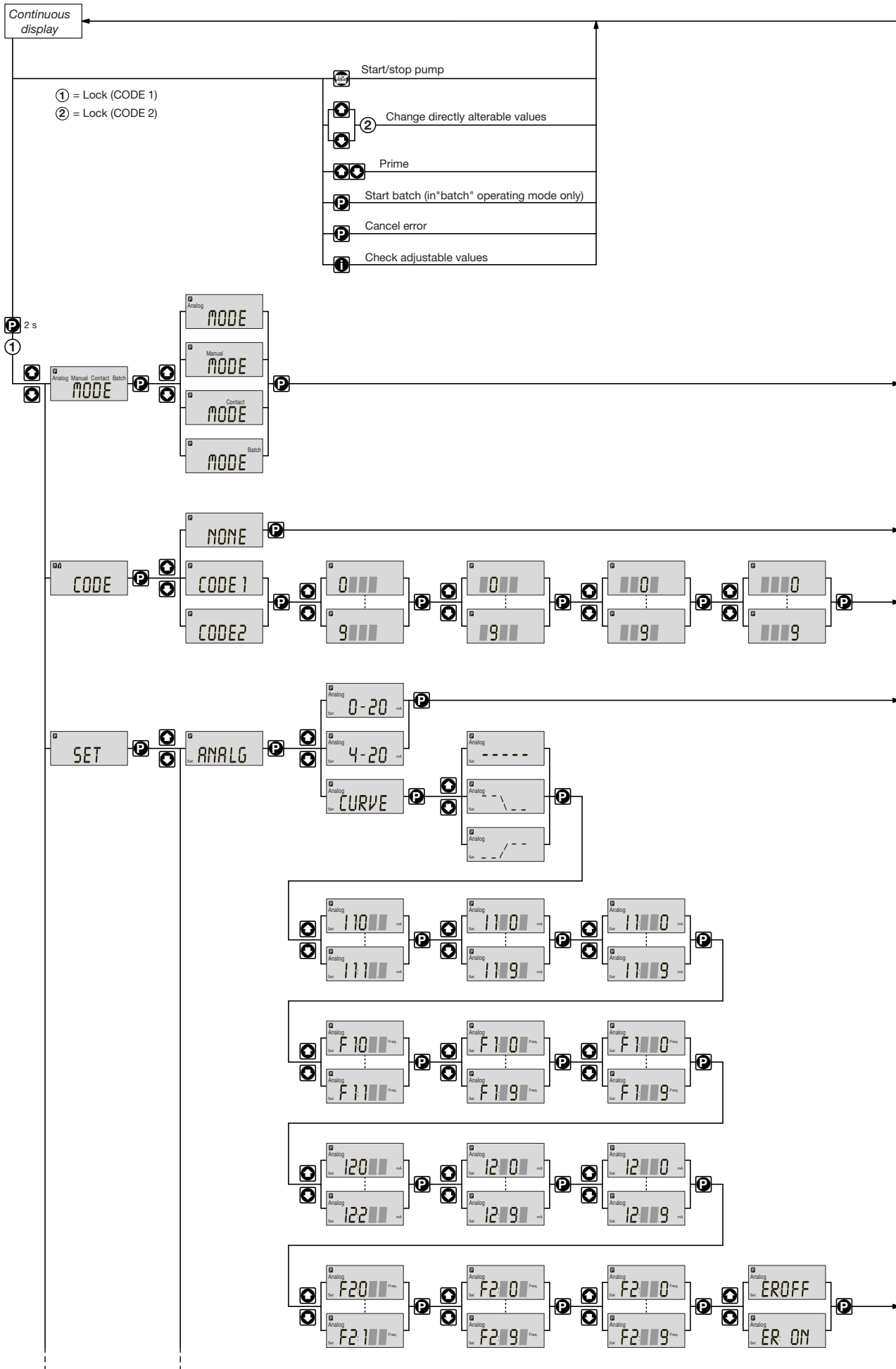
Change directly alterable values

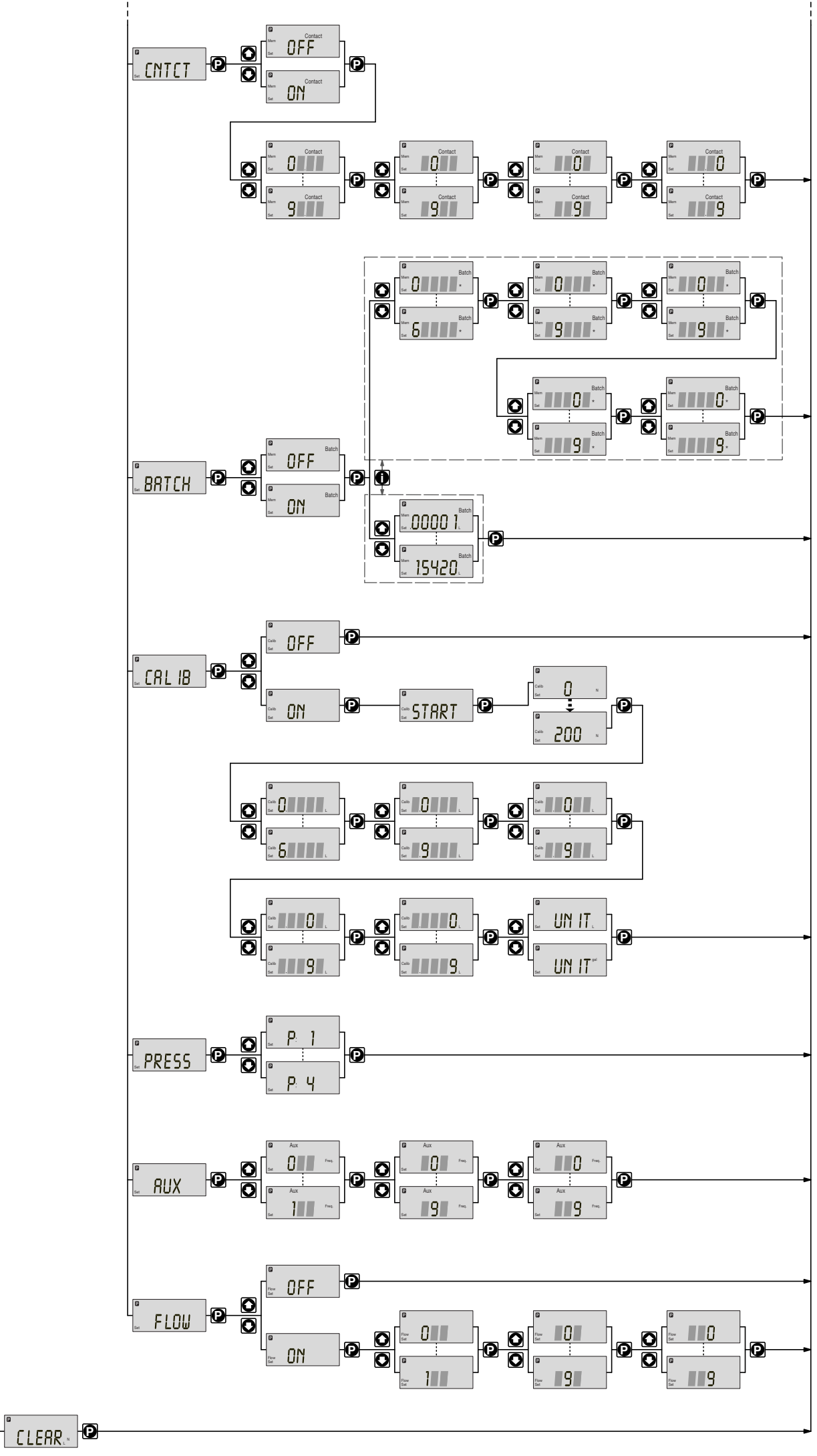
Select other settings,
change individual digit or figure

Press simultaneously

Prime

Operating-/Settings Diagram





Continuous display

Continuous display	Operating mode "Analog" 0-20 mA	Operating mode "Manual"	Operating mode "Contact" with memory and transfer factor 5	Operating mode "Batch" with memory and transfer factor 5
Stroke rate	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 180 Freq.</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 180 Freq.</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact 180 Freq.</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch 180 Freq.</div>
Feed rate	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 7.50 L/h</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 7.50 L/h</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact 7.50 L/h</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch 7.50 L/h</div>
Total stroke number	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 356 N</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 356 N</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact 356 N</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch 356 N</div>
Total litres (feed quantity)	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 12368 L</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 12368 L</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact 12368 L</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch 12368 L</div>
"External" display	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog EXT</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual EXT</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact Mem EXT</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch Mem EXT</div>
Signal current	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 200 mA</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 200 mA</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact 200 mA</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch 200 mA</div>
Strokes remaining	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 25</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 25</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact Mem 25 *N</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch Mem 25 *N</div>
Batch size/ Litres remaining	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 000 10 L</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 000 10 L</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact Mem 000 10 L</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch Mem 000 10 L</div>
Factor	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 500 %</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 500 %</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact Mem 500 %</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch Mem 5 %</div>
Stroke length	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Analog 65 %</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Manual 65 %</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Contact 65 %</div>	<div style="border: 1px solid black; padding: 2px; display: inline-block;">Stop Batch 65 %</div>

⬆️⬆️ = UP and/or DOWN arrow keys, directly alterable values

"Mem" appears only when "memory" function activated

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GALA		Series gamma/ L, version a									
Type	Capacity										
	bar	l/h									
1000	10	0,74	} Solenoid Ø 70/M70								
1601	16	1,1									
1602	16	2,1									
1005	10	4,4									
0708	7	7,1									
0413	4	12,3	} Solenoid Ø 85/M85								
0220	2	19,0									
1605	16	4,1									
1008	10	6,8									
0713	7	11,0									
0420	4	17,1									
0232	2	32,0									
Material version:											
PPE	Polypropylene/EPDM										
PPB	Polypropylene/FPM (Viton®)										
PCE	PVC/EPDM										
PCB	PVC/FPM (Viton®)										
NPE	Acrylic glass/EPDM										
NPB	Acrylic glass/FPM (Viton®)										
TTT	PTFE/PTFE										
SST	Stainless steel 1.4571/PTFE										
Liquid end version:											
0	Non-bleed, no valve spring, for NP, TT and SS only										
1	Non-bleed, with valve spring, for NP, TT and SS only										
2	Bleed function, no valve spring for PP, PC, NP, not type 0232										
3	Bleed function, no valve spring for PP, PC, NP, not type 0232										
9	Self bleed function, for PP, NP, not for type 1000 and 0232										
Hydraulic connection:											
0	Standard connector as indicated in technical data										
5	12/6 hose connector, pressure side only										
9	10/4 hose connector, pressure side only										
Version:											
0	With ProMinent® logo										
Power supply:											
U	100 - 230 V, ±10 %, 50/60 Hz										
Cabel and plug:											
A	2 m Euro										
B	2 m Swiss										
C	2 m Australian										
D	2 m USA										
Relay:											
0	No relay										
1	Fault indicating relay, (N/C) changeover relay										
3	Fault indicating relay, (N/O) changeover relay										
4	As 1 + pacing relay, (1 input each)										
5	As 3 + pacing relay, (1 input each)										
Accessories:											
0	No accessories										
1	Foot and dosing valve,, 2 m PVC suction tube, 5 m PE discharge tubing, PP, PC, and NP only										
2	As 0 + calibrating cylinder										
3	As 1 + calibrating cylinder										
Control variants:											
0	Manual + external 1:1										
1	Manual + external with pulse control										
2	Manual + external 1:1 with analogue current										
3	Manual + external with pulse control + analogue current										
Access code:											
0	No access code										
1	Access code										
Dosing monitoring:											
0	Pulse input										
1	Input for continuous contact										
Pause/level:											
0	Pause N/C/level N/C										

Viton® (FPM) is a registered trademark of DuPont Dow Elastomers.

GALA 1602 PPE 2 0 0 U A 0 0 0 0 0 0

General User Guidelines

Please read through the following user guidelines. Familiarity with these points ensures optimum use of the operating instructions.

On the fold-out page after the title page you will find the overviews “control elements and key functions” and “operating/settings diagrams”.

You will find it useful to open out the “control elements and key functions” overview as you read this instructions manual.

Key points in the text are indicated as follows:

- Enumerated points
- ▶ Hints

Working guidelines:

GUIDELINES

Guidelines are intended to make your work easier.

Safety guidelines:



WARNING

Describes a potentially dangerous situation. Could result in loss of life or serious injury if preventative measures are not taken.



CAUTION

Describes a potentially dangerous situation. Could result in lesser injuries or damage to property if preventative measures are not taken.



TAKE CARE

Describes a potentially threatening situation. Could result in damage to property if preventative measures are not taken.

The name plate affixed to the title page is identical to that on the gamma/ L pump supplied. This facilitates matching the correct operating instructions manual to the correct pump.

Please quote the identity code and the serial number, which you will find on the name plate, in any subsequent correspondence or when ordering spare parts. This will ensure accurate identification of the pump type and material version.

1 About This Pump

The pumps in the ProMinent® gamma/ L pump series are microprocessor controlled solenoid dosing pumps with the following special features:

- The feed rate can be displayed in l/h and/or gal/h, or in strokes/min.
- The stroke rate is continuously adjustable and is displayed in the LCD display.
- Stroke rate adjustment is digitally accurate and is displayed in the LCD display.
- The rated pressure of the gamma/ L can be adapted to individual systems.
- Two pumps can be controlled in different ways via the same standard signal.
- Large, illuminated LCD display

The hydraulic parts of the gamma/ L are identical to those of the Beta®.

2 Safety

Correct use

The gamma/ L must be used for liquids only!

The gamma/ L may be used only in compliance with the technical data and specifications given in the operating instructions!

It is forbidden to use the gamma/ L for any other purpose, or to modify it in any way!

The gamma/ L is not suitable for dosing gases or solids!

The gamma/ L must be used by trained and authorised personnel only!

Safety guidelines



WARNING

- **As soon as the gamma/ L is connected to the electricity supply it may commence pumping!**
Avoid leakage of hazardous chemicals in this case!
If this should occur, then press the STOP/START key or disconnect the gamma/ L from the power supply immediately!
- **The gamma/ L cannot be switched to a current-free status! In the event of an electrical accident, disconnect cable from the mains power supply!**
- **Disconnect cable from the mains power supply before commencing work on the gamma/ L!**
- **Always depressurise liquid end before commencing work on the gamma/ L!**
- **Empty and rinse out the liquid end before commencing work on the gamma/ L after use with hazardous or unknown chemicals!**
- **Pumps for radioactive materials may not be returned to ProMinent after use!**



CAUTION

- **It is not permitted to assemble and install ProMinent® dosing pumps with non-original parts unless these have been checked and recommended by ProMinent. It can result in harm to persons and property for which no liability will be accepted!**
- **When dosing aggressive materials, check the resistance of the pump materials (see ProMinent® resistance list in the product catalogue!)**
- **Observe applicable national directives during installation!**

Sound intensity level

The sound intensity level is < 70 dB (A) at maximum stroke, maximum stroke rate, maximum back pressure (water) in accordance with:

DIN EN ISO 3744 (Reproducibility 2 Determining Sound Intensity Level)

PR DIN EN 12639 (Metering Pump Noise Measurement)

DIN 45635-24 (Machine Noise Measurement)

3 Storage, Transport and Unpacking

Transport and store the gamma/ L in the original packaging!

Protect the packed gamma/ L from moisture and the effects of chemicals!

Environmental conditions for storage and transport:

Storage and transport temperature: -10 bis +50 °C

Humidity: < 92 % relative humidity

Check that the delivery is complete:

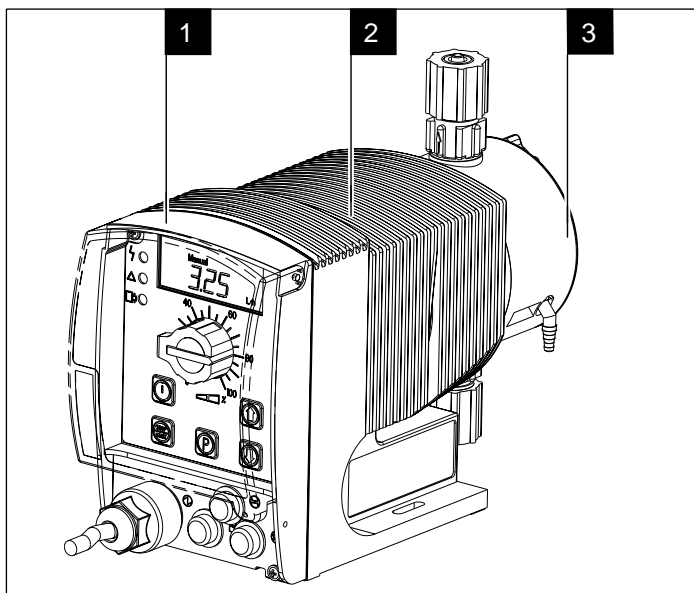
Delivery range

- Dosing pump with mains lead
- Operating instructions manual with EU conformity declaration
- Accessories if applicable

4 Device Overview and Control elements

When reading this section it is helpful to fold out the overview “Control elements and key functions”!

4.1 Device overview



- 1 Control unit
- 2 Power end
- 3 Liquid end

Fig. 01

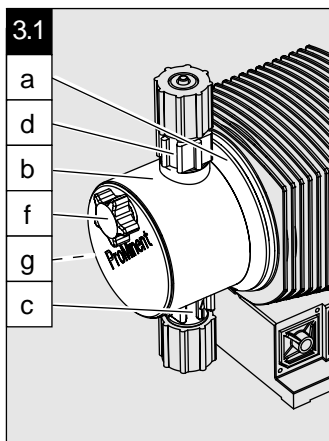


Fig. 02

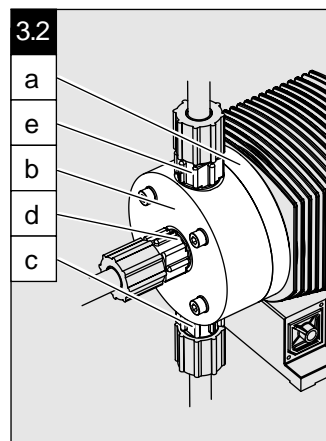


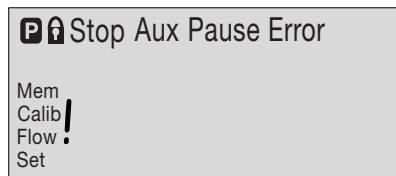
Fig. 03

- a Backplate
- b Liquid end
- c Suction valve
- d Discharge valve
- e Bleed valve
- f Coarse/fine bleed valve
- g Bypass hose nozzle

4.2 Control elements

Please acquaint yourself with the gamma/ L control elements with the help of the “control elements and key functions” overview!

Indicators The LCD display supports the operation and setting of the gamma/ L with a range of indicators:



The indicators are interpreted as follows:

Symbol for P key:	The gamma/ L is in settings mode.
Close symbol:	In a continuous display: lock (if code has been set). In settings mode: indicates access to code menu.
Stop:	The gamma/ L has been stopped using the STOP/START key.
Pause:	The gamma/ L has been stopped using the “pause” function (external).
Aux:	The gamma/ L is pumping at the auxiliary frequency. In AUX menu: the gamma/ L is in the AUX menu.
Error:	A fault has occurred and the pump has been stopped.
Mem:	An additional “memory” function has been set in the “contact” and “batch” operating modes. In CNTCT or BATCH menus (“mem” flashes): the memory function can be set
Calib:	The gamma/ L is in the CALIB menu. In a continuous display (“calib” flashes): more than $\pm 10\%$ deviation of stroke rate from value at the moment of calibration.
Flow:	The gamma/ L is in the FLOW menu.
Set:	The gamma/ L is in the SET menu.
Command symbol:	The number of strokes reached is above the maximum value (99999) that can be shown in the LCD display

5 Function Description

Function principle Dosing takes place as follows: the dosing diaphragm is forced into the liquid end; the pressure in the liquid end causes the suction valve to close and the chemical flows out of the liquid end through the discharge valve. The dosing diaphragm is then forced back out of the liquid end. The vacuum in the liquid end causes the discharge valve to close and fresh chemical flows into the suction valve in the liquid end. This concludes one operating cycle.
The dosing diaphragm is driven by an electronically controlled electrical solenoid.

Feed rate The feed rate is determined by the stroke length and the stroke rate.
The stroke length is set between 0 - 100 % using the stroke length adjusting knob. Optimum dosing reproducibility is achieved by setting the stroke length to between 30 - 100 % (SEK type: 50 - 100 %)!
The stroke rate is set using the arrow keys (not in “analogue” operating mode) to between 0 - 180 strokes/min.

Self-bleed function Pumps with self-bleed function (= SEK types) can operate a prime action even when the discharge tubing is closed, discharging existing air through a bypass valve. These pumps can release gas even during operation, irrespective of the actual operating pressure.
An in-built pressure maintenance valve allows accurate dosing even in depressurised states.

Function Description

- Operating modes* Operating modes are selected using the MODE menu (depending upon identity code, some operating modes may be absent).
- “Analogue” operating mode:** (Identity code, control variant: analogue current)
The stroke rate is controlled via an analogue electrical signal via the “external control” terminal. Signal processing is pre-selected at the controller.
- “Manual” operating mode:** (Identity code, control variant: manual, standard function)
The stroke rate is controlled manually via the controller.
- “Contact” operating mode:** (Identity code, control variant: external 1:1 / external with pulse control)
This operating mode offers the opportunity to make fine adjustments with small increase/decrease factors. Dosing can be activated by a pulse via the “external control” terminal or by a semiconductor element. With the “pulse control” option it is possible to pre-set a feed quantity (batch) or number of strokes (factor 0.01 to 99.99) via the control unit.
- “Batch” operating function:** (identity code, control variant, external 1:1 / external with pulse control)
This operating mode offers the option of working with larger transfer factors (up to 65535). Metering can be triggered by pressing the P key or a pulse from the “external control” terminal via a contact or semiconductor element. A batching quantity or number of strokes can be pre-selected via the control unit.
- Functions* The following functions can be selected using the SET menu:
- “Calibrate” function:**
The gamma/ L can be operated in all operating modes including in calibrating mode. The corresponding continuous displays can show the actual feed quantity or the feed rate. Calibration is maintained within the stroke frequency range 0 - 180 strokes/ min. Calibration is also maintained when a stroke frequency is altered up to $\pm 10\%$.
- “Pressure level” function:**
It is possible to set different pressure levels.
- “Auxiliary frequency” function:**
It is possible to set a stroke rate in the SET menu, which may be activated via the “external control” terminal. This auxiliary frequency overrides all other pre-set stroke rate frequencies.
- “Flow” function:**
Stops the gamma/ L when the flow is insufficient. In the SET menu, the number of failed strokes is entered after which the pump will be turned off.
- The following functions are available as standard:
- “Float switch” function:**
Information on the liquid level in the feed chemical container is transmitted to the gamma/ L. This option requires the installation of a 2-stage float switch. This is connected to the “float switch” terminal.
- “Pause” function:**
The gamma/ L can be stopped by remote control via the “external control” terminal. The “pause” function operates only via the “external control” terminal.
- The following functions are activated by keystrokes:
- “Stop” function:**
The gamma/ L can be stopped by pressing the STOP/START key without disconnecting from the mains power supply.

“Prime” function:

Priming (short term feed at maximum frequency) is activated by pressing both arrow keys at the same time.

Optional relay The gamma/ L has two connection options.

“Fault indicating relay” option:

In the event of fault signals, warning signals or float switch activation signals, connects an electrical circuit to trigger alarm sirens etc. The relay is retrofitted via an aperture in the power end.

“Fault indicating and pacing relay” option:

Along with the fault indicating relay, the pacing relay produces an electrical impulse for every stroke. The relay is retrofitted via an aperture in the power end.

Function and error indicators

The operating and error status is shown via the three LEDs and the “error” indicator on the LCD (see also section 12):

LCD indicator If a fault occurs “error” will appear along with an additional fault warning.

LED indicator

Operating indicator (green)

This indicator is lit as long as the gamma/ L is operating correctly.

Warning indicator (yellow)

This warning light appears if the gamma/ L electronics detect a situation that could lead to a fault, e.g. “liquid levels low 1st stage”.

Warning indicator (red)

This warning light appears if a fault occurs, e.g. “liquid levels low 2nd stage”.

Hierarchy of operating modes, functions and fault statuses

The different operating modes, functions and fault statuses each have a differing effect on whether and how the gamma/ L functions. These effects are given below:

1. **Prime**
2. **Fault, stop, pause**
3. **Auxiliary frequency**
4. **Manual, analogue, contact, batch**

to:

1. “Prime” can be activated in any pump status (as long as it is operable)
2. “Fault”, “stop” and “pause” stop all system parts up to “prime”.
3. The stroke rate of the “auxiliary frequency” always overrides the existing operating stroke rate.

6 Assembly and Installation



WARNING

- The gamma/ L series dosing pumps must be commissioned exactly as described in the operating instructions manual!
- It is not permitted to assemble and install ProMinent® dosing pumps with non-original parts unless these have been checked and recommended by ProMinent.
- Always depressurise tubing before working on the dosing pump. Empty and rinse out the liquid end!
- Never allow the dosing pump to operate when an discharge tube stop tap is closed ! It may burst!
- Remove all water from liquid end before commissioning or rinse with a suitable cleaning agent if using chemicals that should not come into contact with water!
- Before unscrewing the control unit disconnect the mains lead from the power supply!
- Observe applicable national directives during installation!

6.1 Assembling dosing pump



TAKE CARE

- The gamma/ L should be fixed in such a way as to prevent vibration!
- Suction and discharge valve must be upright (bleed valve in self-bleed liquid ends)!
- Ensure free access for operation and maintenance!

Assembling dosing pump

The base of the dosing pump must be mounted on a firm, horizontal surface.

6.2 Assembling tubing

6.2.1 Installation for non-self bleeding pumps



CAUTION

- Tubing must be free from stress and kinks when fitted!
- When dosing extremely aggressive or hazardous chemicals it is advisable to install a bleed valve that feeds back to the container and isolation valves on the prime and discharge sides.
- In order to ensure connections are fast, use correctly sized clamping rings and nozzle unions!
- Use only original hoses with specified dimensions and wall-thicknesses!
- Do not exceed maximum permissible priming pressure (see section 14)!
- It is imperative that the maximum permissible operating pressure is not exceeded (see section 14 and appendix documentation)!

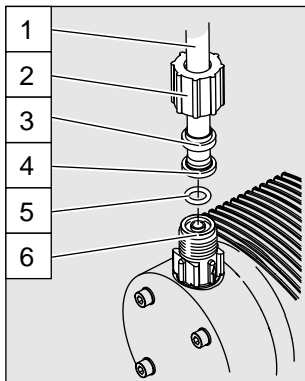
GUIDELINE

The tubing should be attached in such a way as to allow lateral detachment of the gamma/ L and the liquid end if necessary!

PP, PC, NP, TT versions

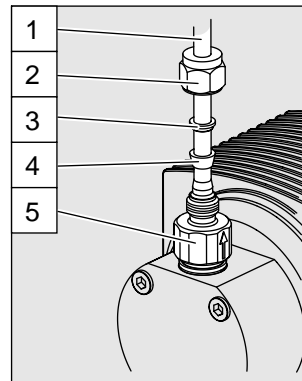
Assembling tubing to plastic valves (see fig. 04)

- ▶ Cut hose ends straight across
- ▶ Push union nut (2) and clamping ring (3) onto hose (1)
- ▶ Push the hose end (1) over the nozzle (4) to the stop. Widen if necessary
- ▶ Make sure that the O-ring (5) is sitting correctly in the valve (6)
- ▶ Place the hose (1) with the nozzle (4) onto the valve (6)
- ▶ Clamp the hose connector:
Tighten the union nut (2) while pressing in the hose (1)
- ▶ Retighten the hose connector:
Pull the tubing (1) connected to the liquid end briefly and then retighten the union nut (2)



- 1 Hose
- 2 Union nut
- 3 Clamping ring
- 4 Nozzle
- 5 O-ring
- 6 Valve

Fig. 04



- 1 Tube
- 2 Union nut ring
- 3 Rear clamping
- 4 Front clamping ring
- 5 Valve

Fig. 05

SS Version

Assembling stainless steel tube connectors to stainless steel valves (see fig. 05)

- ▶ Push union nut (2) and clamping rings (3, 4) onto tube (1) leaving approx. 10 mm distance between them
- ▶ Push tube (1) up to the stop in the valve (5)
- ▶ Tighten union nut (2)

SS Version

Assembling tubing to stainless steel valves



TAKE CARE

Assemble only PE or PTFE tubing to stainless steel valves!

- ▶ Insert an additional support (stainless steel) into PE or PTFE tubing

Installing suction tubing



TAKE CARE

Do not exceed maximum permissible priming pressure on the prime side (see section 14)!

GUIDELINE

- Make suction tubing as short as possible.
- Suction tubing should be rising in order to prevent air bubbles forming!
- As far as possible use swept bends for bends rather than right angle bends!
- Measure the length and cross section to ensure that the vacuum created by the priming action does not reach the vaporising pressure of the feed chemical! In extreme cases excess vacuum on the priming side can cause breaks in the liquid column or incomplete return stroke!
- Please note: "Priming lift x density of feed chemical ≤ max. priming lift" (in m WG)

Assembly of foot valve

- ▶ Cut the free suction end so that the foot valve hangs just above the container base; for chemicals with impurities or sedimentation at the bottom, the foot valve should be positioned well above this layer.

Installing pressure tubing



TAKE CARE

- The discharge tubing should be laid in such a way as to ensure that the pressure surge of the discharge stroke does not exceed the maximum operating pressure. As overload protection for the discharge tubing, it is advisable to fit a relief valve feeding back into the chemical supply container, e.g. a ProMinent® multifunction valve.
- Check that the length and cross section of the tubing are correct!

6.2.2 Installation of self-bleeding pumps



CAUTION

- Observe all installation and safety guidelines for standard pumps!
- Do not exceed tubing cross section, priming lift, priming pressure or viscosity of feed chemical!

In addition to the suction and discharge tubing, a bypass tube should be connected. This is attached to the bleed valve on the upper side of the liquid end (red packing, see fig. 06).

GUIDELINE

The discharge valve is located on the front of the liquid end in the SEK type!

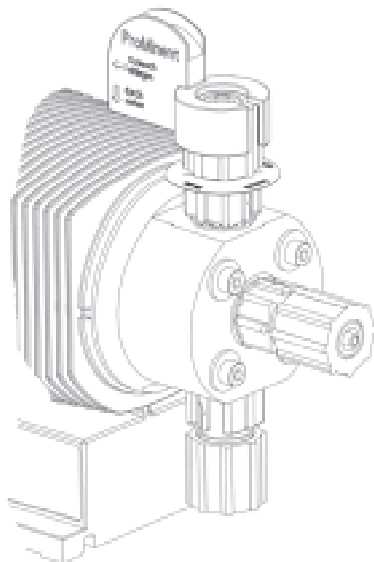
Installation of by-pass tubing

GUIDELINE

When the suction side is primed, at least equal pressure must exist in the bypass tubing!

The pump can operate when the bypass is primed and the suction side is depressurised.

- ▶ Place the tube onto the bypass nozzle and/or bleed valve of the self-bleed function liquid end (recommended: flexible 6x4 PVC hose)
- ▶ Push the free end of the tube back into the dosing container
- ▶ Cut the bypass tube so that it does not enter the feed chemical.



Bleed valve for the bypass tube to the supply container, 6/4 mm

Discharge valve for discharge tubing to injection point, 6/4 - 12/9 mm

Suction valve for suction tubing in supply container, 6/4 - 12/9 mm

Fig. 06

6.3 Electrical installation



WARNING

- Installation must be carried out by a trained engineer!
- Disconnect gamma/ L from mains power supply during installation!
- Observe applicable national directives when installing the dosing pumps!
- When connecting with parallel inductive power consumers a switch contact must be fitted, e.g. relay or contactor!

Connection to mains power supply

Connect the gamma/ L to the mains power supply using the mains lead

Parallel connection to inductive power consumers

If the gamma/ L is connected to the mains in parallel with inductive power consumers (e.g. solenoid valve, motor) they must be electrically isolated. This will avoid damage caused by induction and voltage surges when switching off.

- ▶ Fit individual contacts for the gamma/ L and supply power via auxiliary contactor or relay. If this is not possible, then:
- ▶ Connect a varistor in parallel (order number 710912) or an RC circuit, 0.22 μ F/220 Ω (order number 710802).

Power element (in base of pump)

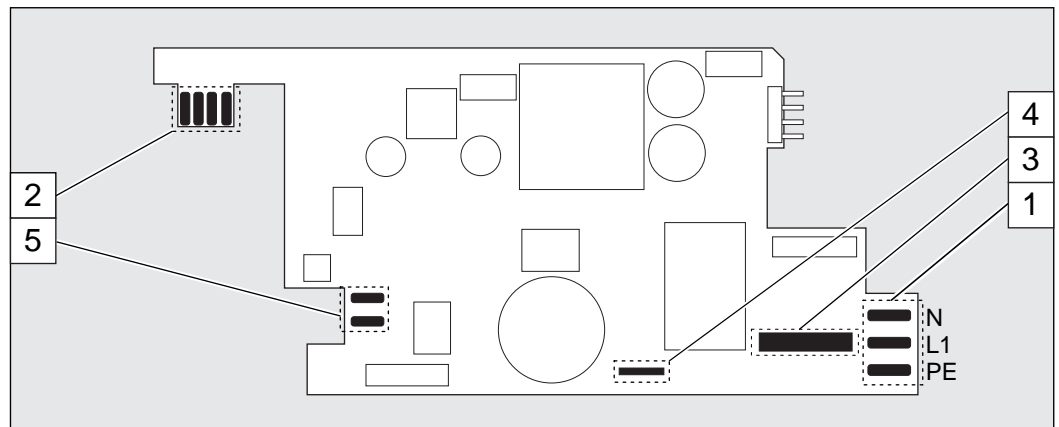


Fig. 07

- 1 Mains terminal
- 2 Relay circuit terminal
- 3 Fuse
- 4 Solenoid earth lead terminal
- 5 Solenoid terminal

“External control” terminal

The “external control” terminal is a five pin in-built terminal. It is compatible with the two and four core cables used previously. The “auxiliary frequency” function is only available with a five core cable.

Assembly and Installation

gamma/ L configuration

Electrical interface for “external contact” - “pause” - “auxiliary frequency”:

- Voltage when contacts open: approx. 5 V
- Input resistance: 10 k Ω
- Control: voltage free contact (load: 0.5 mA at 5 V),
or: Semiconductor switch (residual voltage < 0.7 V)
- Maximum pulse frequency: 25 pulses/s
- Required pulse duration: \geq 20 ms

Electrical interface for “external analogue”:

- Input load resistance: approx. 120 Ω
- Maximum current at input: 50 mA

gamma/ L configuration

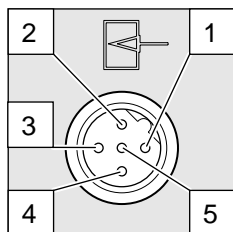


Fig. 08

Pin	Function	2 core cable	4 core cable	5 core cable
Pin 1	Pause	Jumped at pin 4	Brown	Brown
Pin 2	External contact	Brown	White	White
Pin 3	External analogue	–	Blue	Blue
Pin 4	Earth	White	Black	Black
Pin 5	Auxiliary frequency	–	–	Grey

Plug configuration

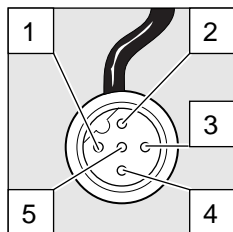


Fig. 09

“Pause” function

The gamma/ L is not operating when

- The cable is connected and pins 1 and 4 are free.

The gamma/ L is operating when

- The cable is connected and pins 1 and 4 are connected.
- There is no cable connected (pin 1 is free).

“Contact” und “Batch” operating modes

One or more discharge strokes are triggered when pin 2 and pin 4 are connected to one another for at least 20 ms.

Otherwise, pin 1 and pin 4 must be connected.

“Analogue” operating mode

The stroke frequency of the gamma/ L is controlled via an electrical signal. The electrical signal is applied between pins 3 and 4.

Otherwise, pin 1 and pin 4 must be connected.

“Auxiliary frequency” function

The gamma/ L runs at a pre-set stroke rate when pin 5 and pin 4 are connected to one another. Otherwise, pin 1 and pin 4 must be connected.

The factory setting for this function is 180 strokes.

GUIDELINE

For function and operating mode hierarchy, see section 5!

Connecting two gamma/ L pumps in series

Connect two gamma/ L pumps in series as follows if you wish to control both via an electrical signal in the “analogue” operating mode (see section 7.4.2):

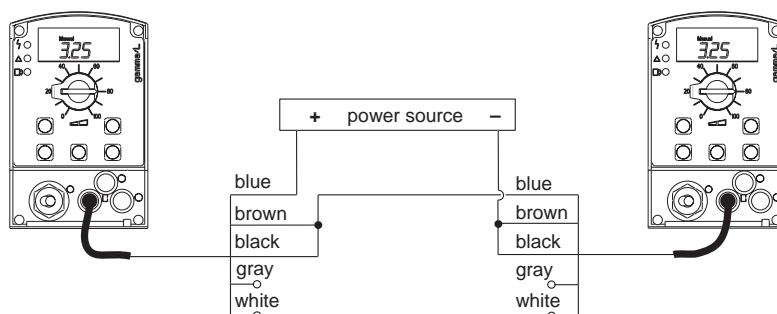


Fig. 10

“Float switch” terminal

Optional fitting of a 2-stage float switch with prior warning and limit switch capacity.

gamma/ L configuration

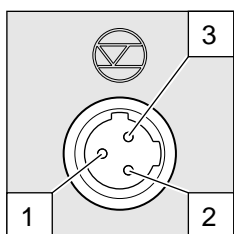


Fig. 11

Electrical interface:

- Voltage when contacts open: approx. +5 V
- Input resistance: 10 kΩ
- Controller: voltage free contact (load: 0.5 mA at + 5V),
or: semiconductor switch (residual voltage < 0.7 V)

Plug configuration

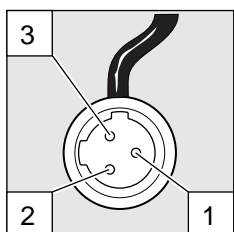


Fig. 12

Function

- Pin 1 Earth
- Pin 2 Minimum prior warning
- Pin 3 Minimum limit switch

3 core cable

- black
- blue
- brown

“Dosing monitor” terminal

Optional connection of dosing monitor.

gamma/ L configuration

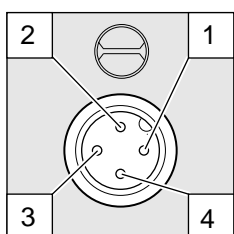


Fig. 13

Electrical interface:

- Voltage when contacts open: approx. +5 V
- Input resistance: 10 kΩ
- Controller: voltage free contact (load: 0.5 mA at + 5V)

Plug configuration

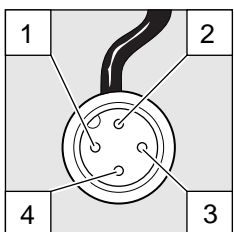


Fig. 14

Function

- Pin 1 Power supply (5V)
- Pin 2 Encoding
- Pin 3 Response
- Pin 4 Earth

4 core cable

- brown
- white
- blue
- black

Relay

*“Fault indicating relay”
output*

A fault indicating relay may be ordered optionally. It is used as the signal output when a pump fault has been detected and to indicate the prior warning signal “liquid level low, stage 1” and the fault signal “liquid level low, stage 2”.

Allocation of signal types to “N/O” and “N/C” relay states is selected on the basis of the identity code descriptors.

The relay can be retrofitted and is ready to operate after inserting the relay component (see section 6.4).

The gamma/ L is delivered ex works with default settings for a N/C relay. If an alternative switch function is required the gamma/ L can be reprogrammed at ProMinent.

Electrical interface

- Contact load: 250 V/2 A 50/60 Hz
- Operating life: > 200.000 switch cycles

*“Fault indicating relay and
pacing relay” output*

A fault indicating relay and pacing relay output may be ordered optionally. The pacing relay output is electrically isolated via an optical coupler with a semiconductor switch. The second switch is a relay as for the “fault indicating relay” variant.

The fault indicating / pacing relay can be retrofitted (see section 6.4).

The gamma/ L is delivered ex works with default settings for a N/C fault indicating relay and a N/O pacing relay. If an alternative switch function is required the gamma/ L can be reprogrammed at ProMinent.

Electrical interface

For semiconductor switch

- Residual voltage: < 0,4 Volt at $I_c = 1 \text{ mA}$
- Maximum voltage: < 100 mA
- Maximum current: 24 V/DC
- Pacing relay pulse duration: approx. 100 ms

For relay output

- Contact load: 24 V/100 mA 50/60 Hz
- Operating life: > 200.000 switch cycles

Relay cable contact configuration

“Fault indicating relay” option

VDE cable

white
green
brown

CSA cable

white
red
black

Contact

NO (normally open)
NC (normally closed)
C (common)

*“Fault indicating relay
and pacing relay” option*

VDE cable

yellow
green
white
brown

Contact

NO (normally open)
C (common)
NO (normally open)
C (common)

Relay

Fault indicating relay
Fault indicating relay
Pacing relay
Pacing relay

6.4 Retrofitting relays

Delivery range:

- 1 relay circuit set with 2 screw fasteners
- 1 relay cable set with socket
- 1 seal

Press-out relay opening



WARNING

Disconnect gamma/ L from the mains power supply and rinse liquid end before commencing work (see section 13)!



TAKE CARE

When preparing the opening, ensure that the punch is not forced through the entire pump base!
Pump circuits may become damaged.

- ▶ Place the gamma/ L on a firm surface with the relay opening press-out section at the top (see fig. 15:a)
- ▶ Place a punch (dia. 8-15 mm) in the centre of the relay opening press-out section , and strike briefly and sharply with a hammer (approx. 250 g)
- ▶ If necessary clean up the edges of the opening
- ▶ Remove the pressed out section from the gamma/ L

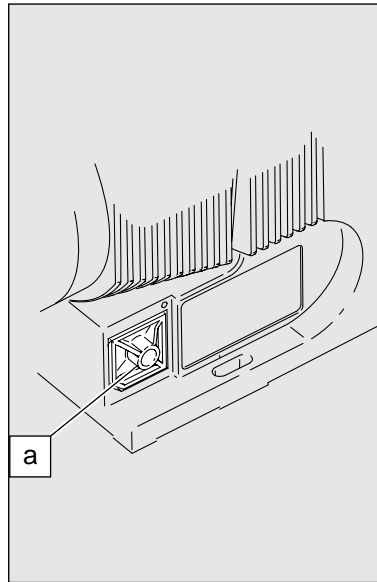


Fig. 15

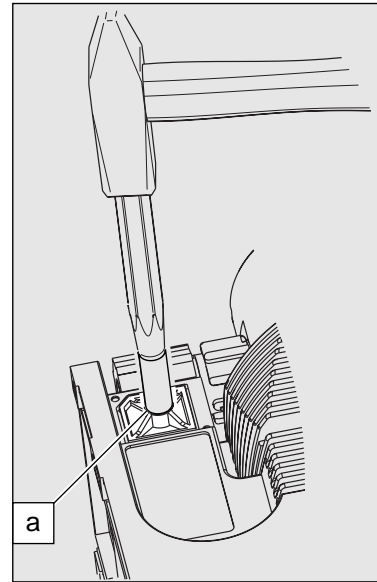


Fig. 16

- Inserting the relay component*
- ▶ Hold the relay component with your right hand gripping the left and right hand edges of the relay cover, and tilt the front end slightly to the left (see fig. 17)
 - ▶ Push the relay component through the relay opening, holding the upper corner of the lower edge against the guide rail on the pump base, until the contact of the relay component has reached the controller contact. (See fig. 18: test: can you still move the end of the circuit back and forth?)
 - ▶ Gently push the relay component right into the opening.
 - ▶ Screw the relay cover firmly onto the housing using the screws provided.
 - ▶ Insert the relay cable plug seal into the relay cover and screw on the plug (see fig. 19)

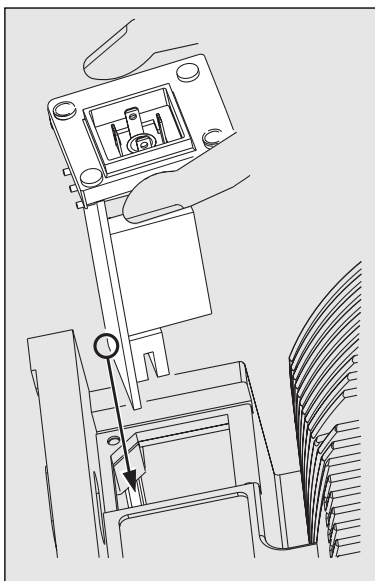


Fig. 17

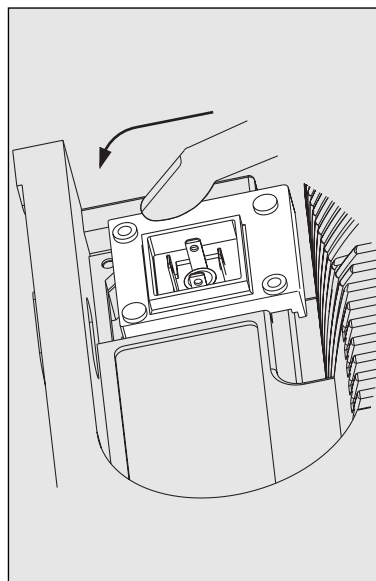


Fig. 18

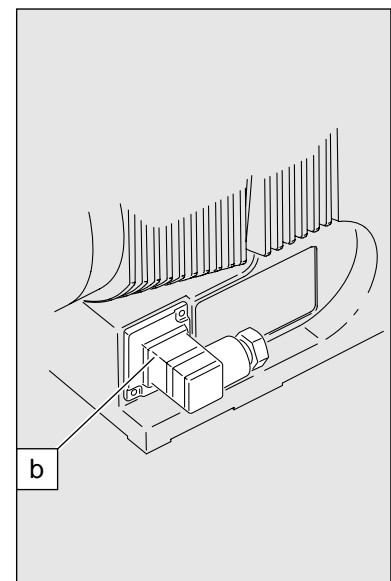


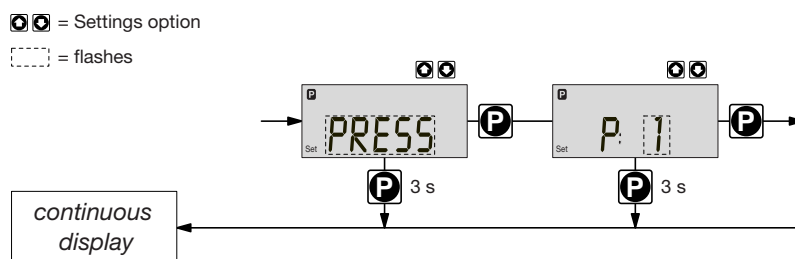
Fig. 19

7 Settings

GUIDELINE

- Open out the fold-out page following the title page fully! There you will find the overviews “control elements and key functions” and “operating settings diagram”.
- If no keys are pressed within a period of 1 minute, the gamma/ L will return to a continuous display.

Basic information for setting up the gamma/ L

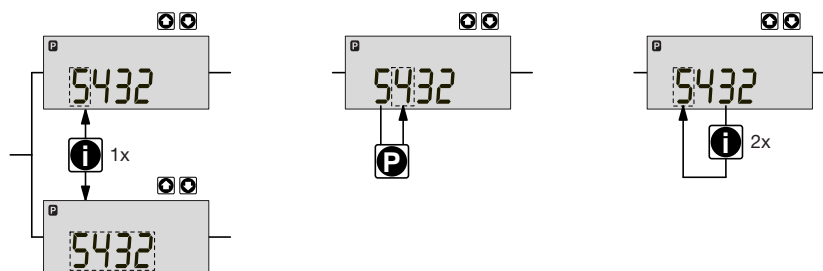


Confirm entries

Press the P key briefly;
You will automatically move to the next menu option or to a continuous display.

Exit menu option without confirming

Press the P key for 3 s:
The entry is cancelled and you will return to a continuous display.



Incremental change of a value

Press the i key 1x;
you can toggle between altering the digits of a value (“change individual digits” = standard) or incremental alteration of a value (“change a figure”).

Change adjustable values

Press UP or DOWN arrow key;
The flashing digit or figure will start to increase or decrease incrementally.

Confirm adjustable values

For “change individual digits”: confirm each digit using the p key. When the last digit has been confirmed you will automatically move to the next menu option or to a continuous display.
For “change a figure”; press the P key 1x; you will simultaneously move to the next menu option or to a continuous display.

Correct wrongly set digits

Press the i key 2x;
you will go back to the first digit.

7.1 Check adjustable values

Before setting up the gamma/ L you can check the current settings of adjustable values. Press the i key (“i” as in “info”) when the gamma/ L is in continuous display mode (There is no P key symbol in the LCD display):

Each time you press the i key you will see a different continuous display. The number of continuous displays depends upon the identity code, the selected operating mode and the connected accessories (see overview “continuous displays”).

7.2 Change to settings mode

If you hold down the P key for 2 seconds in any continuous display, the gamma/ L will change to the settings mode.

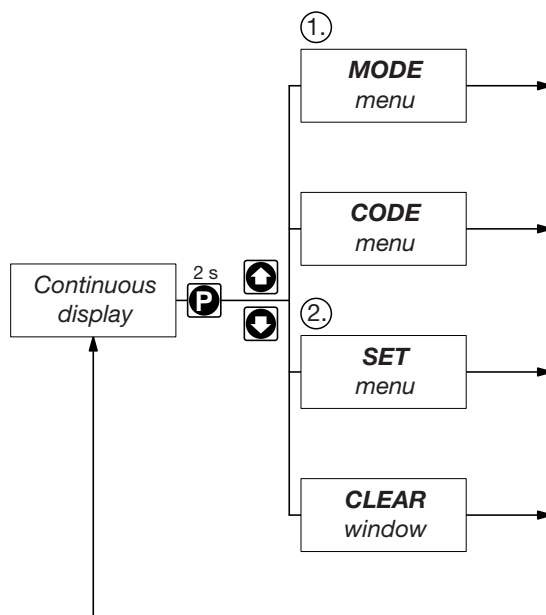
If CODE 1 is set, the code must be entered after pressing the P key.

The following menu options appear first in the settings mode (see also overview “Operating/ settings diagram”):

- MODE menu
- CODE menu (optional)
- SET menu
- CLEAR window

In order to adapt the gamma/ L to your process requirements you must:

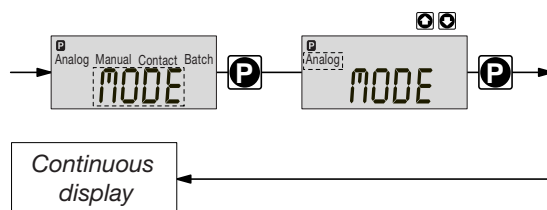
1. Select the operating mode in the MODE menu
2. Adjust settings to this operating mode in the SET menu



7.3 Select operating mode (MODE menu)

The following operating modes are selected via the MODE menu (depending upon identity code, some operating modes may be absent):

- Manual: for operation by hand
(Identity code, control variant: manual, standard option)
- Analogue: for electronic control
(Identity code, control variant: analogue current)
- Contact: for contact operation
(Identity code, control variant: external 1:1 / external with pulse control)
- Batch: for batch operation
(Identity code, control variant: external with pulse control)



7.4 Settings for operating mode (SET menu)

In the SET menu you can adjust various settings depending upon the selected operating mode. The following programmable function settings menus appear in all operating modes:

- Calibrate (CALIB menu)
- Pressure levels (PRESS menu)
- Auxiliary frequency (AUX menu)
- Flow (FLOW menu, available only if flow monitor is connected)

See also section 7.5!

Further settings menus depend upon the selected operating mode.

7.4.1 Settings for “manual” operating mode

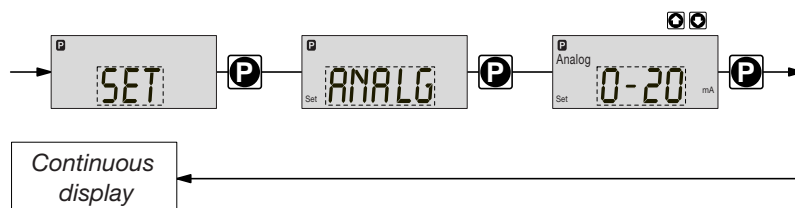
There are no other settings menus in the overall SET menu for the “manual” operating mode apart from those described in 7.5.

7.4.2 Settings for “analogue” operating mode (ANALG menu)

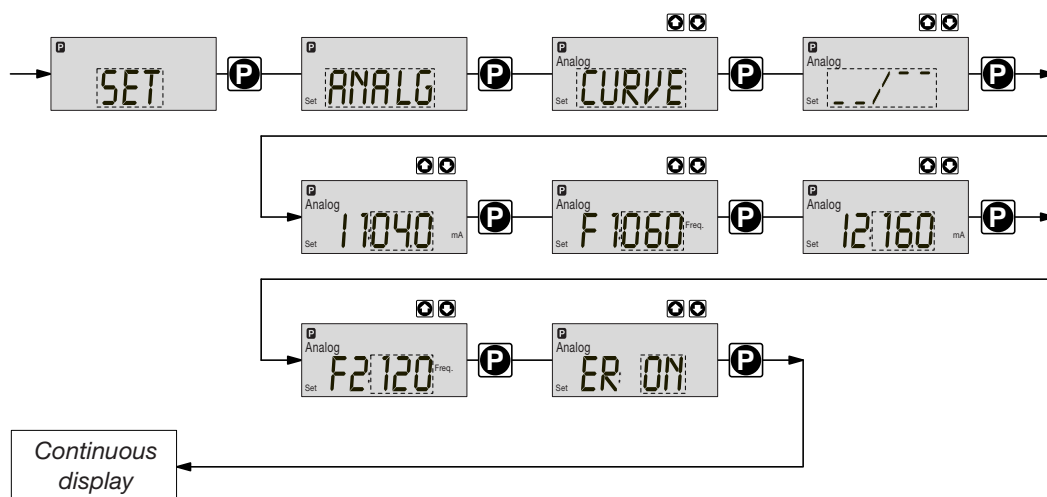
In addition to those settings menus described in 7.5, there is an additional ANALG menu in the overall SET menu for the “analogue” operating mode.

The stroke rate is controlled by an analogue electrical signal via the “external control” terminal. You can select three signal-processing methods:

- 0 - 20 mA: at 0 mA the gamma/ L does not operate
at 20 mA the gamma/ L operates at 180 strokes/min.
Between these two extremes the stroke rate is proportional to the electrical signal.



- 4 - 20 mA: at 4 mA the gamma/ L does not operate
at 20 mA the gamma/ L operates at 180 strokes/min.
Between these two extremes the stroke rate is proportional to the electrical signal.
For signals of below 3.8 mA a fault will be detected and the gamma/ L will stop (e.g. cable break).
- Curve: In the “curve” processing mode you can programme the gamma/ L ratios.
There are 3 options available:
 - ----- = straight line
 - --- \ --- = lower band
 - --- / --- = upper band



Straight line:

The following symbol appears in the LCD display: ----- .
You can enter any stroke frequency ratio for the gamma/ L in proportion to the electrical signal. You must enter two points P1 (I1, F1) and P2 (I2, F2). F1 is the stroke rate at which the pump should operate at current I1: the straight line and the ratio are fixed accordingly:

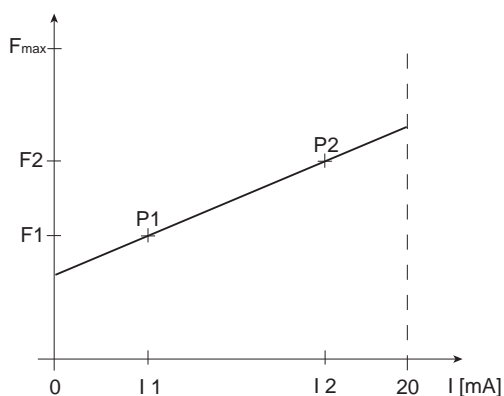


Fig. 20

GUIDELINE

Draw a diagram like the one above - with values for (I1, F1) and (I2, F2) - in order to set the gamma/ L to your required stroke rate !

Lower/upper band:

This processing mode allows you to control a pump via an electrical signal as shown in the diagrams below.

You may also control two pumps for different feed chemicals from a single signal (e.g. one acid pump and one alkali pump from a pH sensor signal). The pumps must be connected electrically in series (see wiring plan in section 6.3).

Lower band

e.g. Alkali pump

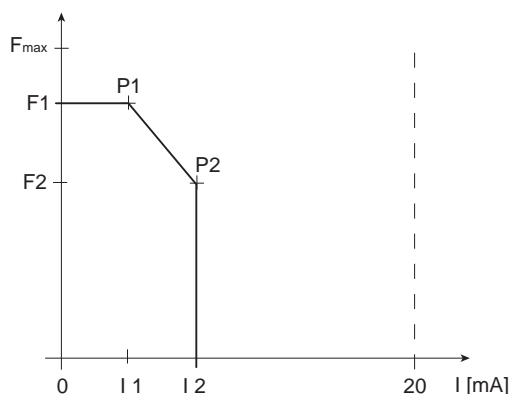


Fig. 21

Upper band

e.g. acid pump

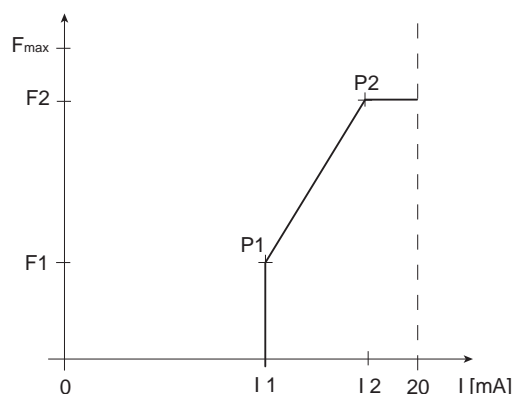


Fig. 22

Lower band:

The symbol $\text{---}\backslash\text{---}$ appears in the LCD display. The gamma/ L will operate below $I1$ at $F1$. Above $I2$, the gamma/ L ceases to operate. Between $I1$ and $I2$ the stroke rate is between $F1$ and $F2$, proportional to the signal current.

Upper band:

The signal $\text{---}/\text{---}$ appears in the LCD display. The gamma/ L will cease to operate below $I1$. Above $I2$, the gamma/ L will operate at $F2$. Between $I1$ and $I2$ the stroke rate between is $F1$ and $F2$, proportional to the signal current.

Above $I2$ the gamma/ L will continue to operate at $F2$.

The smallest processable difference between $I1$ and $I2$ is 4 mA.

Error processing

In the "ER" (error) menu option you can activate an error processing function for the "curve" mode. An error message appears for signals below 3.8 mA and the gamma/ L stops.

7.4.3 Settings for "contact" operating mode (CONTCT menu)

In addition to those settings menus described in 7.5, there is an additional CONTCT in the overall SET menu for the "contact" operating mode.

The operating mode "contact" allows you to activate a single stroke or a series of strokes. The strokes can be activated by a pulse or via the "external control" terminal. This operating mode is intended to transfer input pulses into a reduction (break) or small increase in strokes.

The following versions are available:

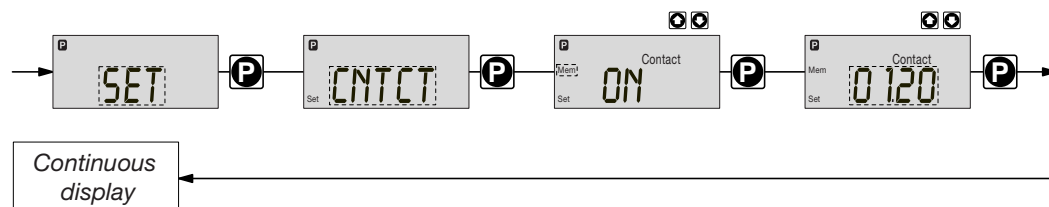
- Contact - identity code: external 1:1
- Contact - identity code: external with pulse control

Contact – identity code: external 1:1

In the “contact - identity code: external 1:1” version the gamma/ L makes precisely 1 stroke per pulse (identity code: external 1:1). No entry possible.

Contact – identity code: external with pulse control

In the “contact - identity code: external with external pulse control” you can enter the number of pulses after which a stroke should be carried out. “Contact - identity code: external with external pulse control” is intended for small dosing quantities.



The number of strokes per pulse depends upon the factor, which you can enter. This allows you to vary to a certain extent the input pulses by a factor of 1.01 to 99.99 and/or reduce by a factor of 0.01 to 0.99:

“Number of strokes activated = factor x number of input pulses”

Examples	Factor	Pulse (sequential)	Stroke number (sequential)
Increase	1	1	1
	2	1	2
	25	1	25
	9999	1	9999
	1.50	1	1.5 (1 / 2)
	1.25	1	1.25 (1 / 1 / 1 / 2)
Reduction	1	1	1
	0.50	2	1
	0.10	10	1
	0.01	100	1
	0.25	4	1
	0.40	2.5 (3 / 2)	(1 / 1)
	0.75	1.33 (2 / 1 / 1)	(1 / 1 / 1)

Explanation of increase

- At a factor of 1 For every 1 pulse, 1 stroke is activated
- At a factor of 2 For every 1 pulse, 2 strokes are activated
- At a factor of 25 For every 1 pulse, 25 strokes are activated

Explanation of decrease

- At a factor of 1 After 1 pulse, 1 stroke is activated
- At a factor of 0.5 After 2 pulses, 1 stroke is activated
- At a factor of 0.1 After 10 pulses, 1 stroke is activated
- At a factor of 0.75 After 2 pulses, 1 stroke is activated, then after 1 pulse, 1 stroke is activated, then after 2 pulses, 1 stroke is activated etc.

GUIDELINE

If a remainder occurs when the factor is processed, the gamma/ L counts up the remainder values. When the sum reaches or exceeds “1” the gamma/ L will activate a stroke. This ensures that the stroke number corresponds exactly to the factor throughout the dosing operation .

The number of input pulses which have not been processed are stored by the gamma/ L in the stroke memory. When the STOP/START key is pressed or the “pause” function is activated, the stroke memory is deleted (this can be avoided using the “memory” extension function, see below).

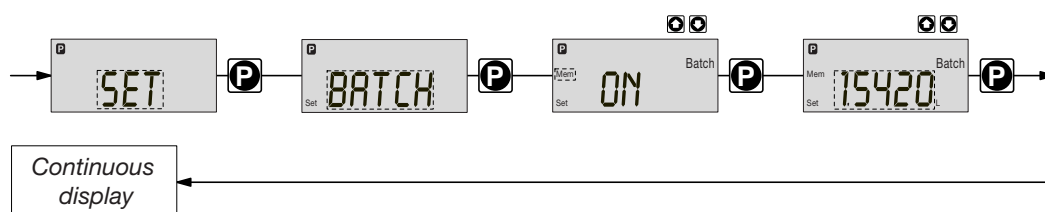
The “contact - identity code: external with pulse control” version allows optimum adaptation of the gamma/ L, in conjunction with e.g. water contact meters, to any process.

“Memory” extension function

The “memory” extension function can be optionally activated (“mem” appears in the LCD display). The remaining strokes will not then be deleted when the STOP/START key is pressed or the “pause” function is activated.

7.4.4 Settings for “batch” operating mode (BATCH menu)

In addition to those settings menus described in 7.5, there is an additional BATCH menu in the overall SET menu for the “batch” operating mode.



The “batch” operating mode is a variant of the “contact” operating mode (see 7.4.3).

You can pre-select a stroke number (no breaks, whole numbers only) as well as a feed quantity (batch). To switch between entries for “stroke number” and “feed quantity” press the i key 1x in the corresponding menu option (see also overview “Operating / settings diagram”, fold-out page).

The “batch” operating mode is intended for large dosing quantities.

The number of input pulses which have not been processed are stored by the gamma/ L in the stroke memory. When the STOP/START key is pressed or the “pause” function is activated, the stroke memory is deleted (this can be avoided using the “memory” extension function, see below).

“Memory” extension function

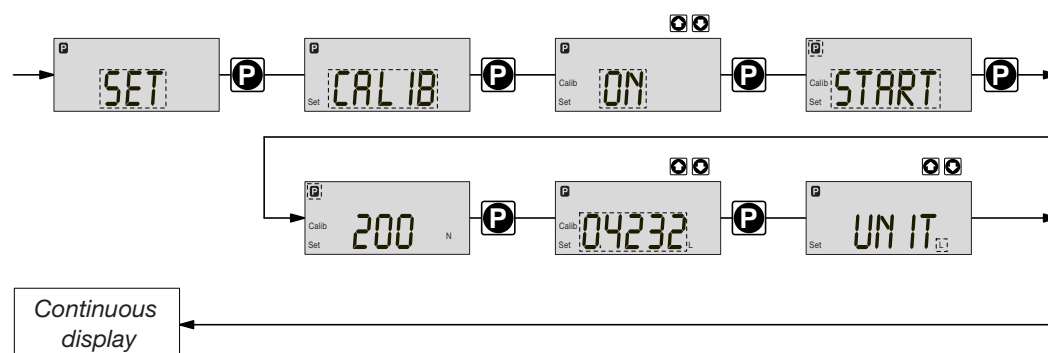
The “memory” extension function can be optionally activated (“mem” appears in the LCD display). The remaining strokes will not then be deleted when the STOP/START key is pressed or the “pause” function is activated.

7.5 Settings for programmable functions (SET menu)

The following programmable function settings menus appear in all operating modes:

- Calibrate (CALIB menu)
- Pressure levels (PRESS menu)
- Auxiliary frequency (AUX menu)
- Flow (FLOW menu, available only if flow monitor is connected)

7.5.1 Settings for “calibration” function (CALIB menu)



The gamma/ L can also run in calibration mode. The corresponding continuous displays show the current dosing quantities or the feed rate.

Calibration is maintained when a stroke rate is altered up to $\pm 10\%$. If the stroke rate is altered more than $\pm 10\%$ the yellow warning light is lit, the continuous display flashes and the flashing message “calib” appears.

GUIDELINE

- Do not go below 30 % stroke length (SEK type: 50%). This will significantly affect accuracy of calibration.
- Calibration becomes increasingly accurate the more strokes made by the gamma/ L during calibration (recommended: at least 200 strokes).



WARNING

- **If using a hazardous feed chemical, the following setting instructions ensure adequate safety precautions have been taken!**

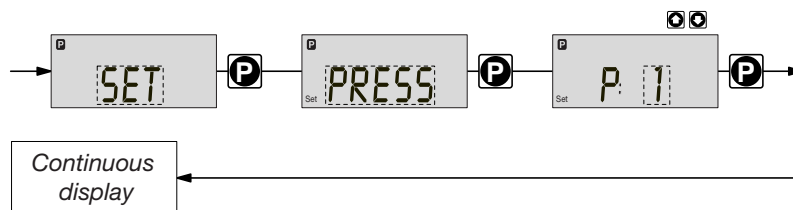
- Calibration*
- ▶ Insert the suction tube into a measuring cylinder containing the feed chemical - the discharge tubing must also be correctly installed (operating pressure,...!)
 - ▶ Suck up the feed chemical (press both arrow keys at the same time) when the suction tube is empty
 - ▶ Note the liquid level in the measuring cylinder and the stroke length
 - ▶ Select the CALIB menu and go the first menu option using the P key
 - ▶ Select “ON” using an arrow key and change to the next menu option using the P key
 - ▶ To commence calibration, press the P key. The gamma/ L starts to pump and displays the number of strokes (“STOP” appears at regular intervals)
 - ▶ After a sufficient number of strokes, stop the gamma/ L with the P key
 - ▶ Calculate the dosed quantity (difference between the original quantity and the quantity remaining)
 - ▶ Enter this quantity in the menu and then go to the next menu option using the P key
 - ▶ Select the unit (“L” or “gal”) in the “UNIT” menu with an arrow key

The gamma/ L is calibrated.

The corresponding continuous displays show the calibrated values.

The total stroke number and total litres are set during calibration to “0”.

7.5.2 Settings for the “pressure levels” function (PRESS menu)



The programmable function “pressure levels” is used to reduce the rated pressure of the gamma/ L.



CAUTION

- The rated pressure can be considerably exceeded at stroke lengths of below 100 %! The rated pressure relates to a stroke length of 100 %.
- If another liquid end size is installed the pump must be reprogrammed on factory premises!
- Select as large a rated pressure as required and as small as possible! This will increase system safety (reduces the risk of the tubing bursting when blocked)! This also protects the diaphragm and saves electricity.

GUIDELINE

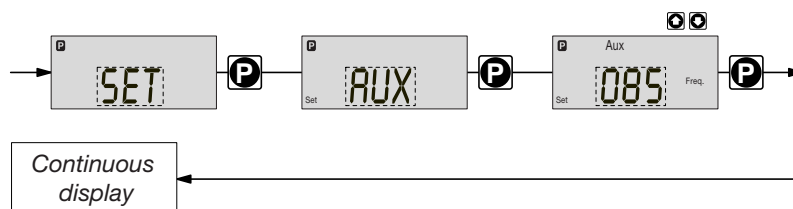
If installing another liquid end size the pump must be reprogrammed on factory premises.

The following rated pressures can be selected for these liquid end sizes (rated pressure in bar):

Liquid end size	Pressure level 1	Pressure level 2	Pressure level 3	Pressure level 4
1601, 1602, 1605	4	7	10	16
1000, 1005, 1008	4	7	10	
0708, 0713	4	7		

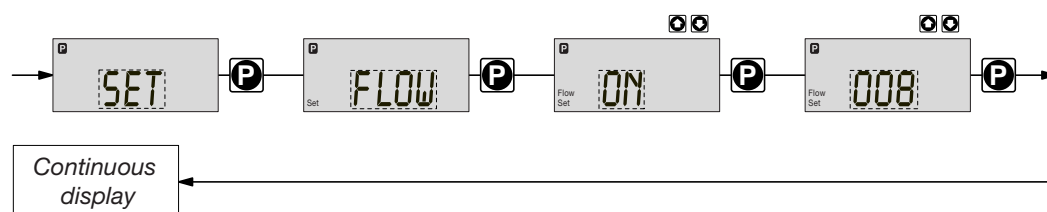
No adjustments can be made for pump types 0413, 0420, 0220, 0232.

7.5.3 Settings for “auxiliary frequency” function (AUX menu)



The programmable function “auxiliary frequency” allows switching to a different stroke frequency, which can be set in the AUX menu. It can be activated via the “external control” terminal. When the auxiliary frequency is activated, “aux” appears in the LCD display. This auxiliary frequency overrides the current stroke frequency set for the selected operating mode.

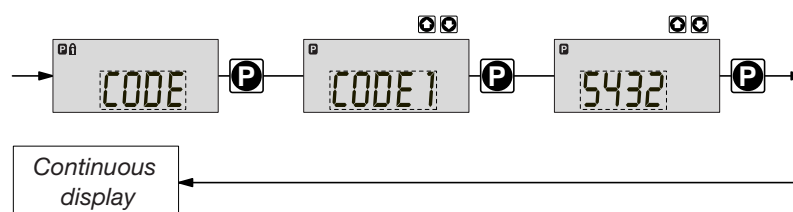
7.5.4 Settings for the “flow” function (FLOW menu)



The flow menu only appears when a dosing monitor is connected to the “dosing monitor” terminal. This dosing monitor registers each discharge stroke of the gamma/ L at the discharge connector and transmits it back to the gamma/ L. If this response transmission is serially omitted for a period set in the FLOW menu (due to failure or below-minimum dosing) the gamma/ L stops.

7.6 Setting code (CODE menu)

The code menu is used to select whether you want to prevent access to parts of the settings options.



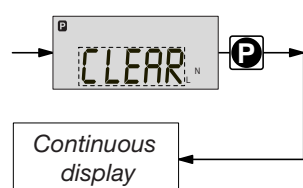
In the first menu option you can choose CODE 1 or CODE 2 (both use the same number).

- Select CODE 1 to prevent access to the settings mode (① in the overview “Operating / settings diagram”, fold-out page). In the next menu option, enter the number you wish to use as the code.
- Select CODE 2 to prevent access to the settings options for directly alterable values in the continuous displays (② in the overview “Operating / settings diagram”, fold-out page). In the next menu option, enter the number you wish to use as the code.
- Select NONE to remove a pre-set security lock.

7.7 Cancel total stroke number or total litres (CLEAR window)

In the CLEAR window you can delete the stored total stroke number and simultaneously the total litres (= set to “0”). You may then press the P key briefly to exit this window.

The values displayed are counted incrementally from the point of commissioning the pump, or from the last delete action.



8 Commissioning



WARNING

- Protect yourself from contact with hazardous feed chemicals!
- Remove all water from liquid end before commissioning or rinse out with a suitable material if using chemicals that should not come into contact with water! (Proceed as described below. The liquid end may contain water left over from factory testing.)
- After long periods out of commission the gamma/ L is not guaranteed to meter absolutely reliably, as feed chemicals in the valves and diaphragm can crystallise! Check valves and diaphragm regularly (see section 10)!
- Check the seals of the pump connections and connectors.
- Check whether coarse or fine bleed vent is closed (see also fine bleed function).

GUIDELINE

- Set stroke length only while pump is running!
- The gamma/ L should prime at 100 % stroke length as the suction lift is dependent upon lift volume when the liquid end is empty. If the gamma/ L is required to prime at less than 100 % stroke length, and fails to do so, then select a correspondingly smaller suction lift.
- SEK type: priming capacity is diminished if discharge takes place against pressure!
- Retighten screws in liquid end after 24 hours (see section 10)!

Removing water from liquid end

When using with chemicals that should not come into contact with water:

- ▶ Turn the pump so that the discharge connector is pointing downwards.
- ▶ Allow water to run out of the liquid end.
- ▶ Rinse the suction connector from above with a suitable material.

Filling liquid end



WARNING

Protect yourself from contact with hazardous feed chemicals!

For liquid ends without coarse/fine bleed function:

- ▶ Connect suction tubing, but not discharge tubing, to liquid end
- ▶ Switch on the gamma/ L and allow to run at maximum stroke length and stroke rate, until the liquid end is full and free from air bubbles (a little feed chemical will seep out of the discharge valve)
- ▶ Switch off the gamma/ L
- ▶ Connect discharge tubing to liquid end

The gamma/ L is ready to operate.

For liquid ends with coarse/fine bleed function:

- ▶ Connect suction and discharge tubing to liquid end
- ▶ Connect bypass tubing
- ▶ Open the bleed valve by rotating the knob on the top anticlockwise. Opens access to the bypass tubing for coarse bleed function.
- ▶ Switch on the gamma/ L and allow to run at maximum stroke length and stroke rate, until the liquid end is full and free from air bubbles (the feed chemical is visible in the bypass and discharge tubing)
- ▶ Close the bleed valve (turn clockwise)
- ▶ Switch off the gamma/ L

The gamma/ L is ready to operate.

GUIDELINE

- For gaseous chemicals there must be a continuous partial flow back to the supply container. The return flow quantity should be approx. 20 % of the feed quantity.
- The feed chemicals should be non-viscous and free from suspended particles.
- The bypass tubing should end above the liquid level in the supply container. The fine bleed valve then acts as a vacuum breaker which prevents the possibility of a vacuum in the discharge tubing causing the container to be emptied.

Fine bleed function

When metering slightly gaseous chemicals the liquid end can be continuously de-aerated via the fine bleed vent, if a coarse/fine bleed vent is present.

Open fine bleed vent (see fig. 23):

- ▶ Pull off the cap (a) from the coarse/fine bleed vent (b).
- ▶ Turn the screw (c) in the coarse/fine bleed vent approx. 1 turn anticlockwise with a screwdriver.

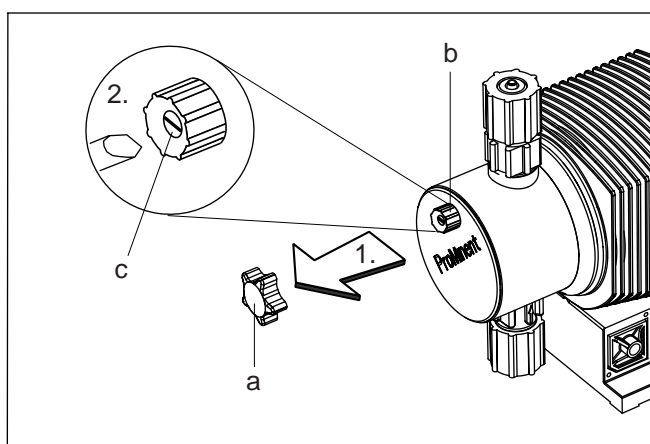


Fig. 23

For self-bleed dosing pumps (SEK type):

GUIDELINE

On this liquid end the discharge connector is horizontal - the bleed valve is at the top! (The bleed connector is identified on delivery with a red collar!)

- ▶ Connect the suction and discharge tubing to the liquid end
- ▶ Connect the bypass tubing to the liquid end
- ▶ Switch on the gamma/ L and allow to run at maximum stroke length and stroke rate until the liquid end is full and free from air bubbles (the feed chemical is visible in the bypass and discharge tubing)
- ▶ Switch off the gamma/ L

The gamma/ L is ready to operate.

8.1 Precision dosing settings

GUIDELINE

- For highly viscous and gaseous chemicals select a large stroke length and a low stroke rate!
- For good mixing action, select a low stroke length and high stroke rate!
- For precision dosing, set stroke length higher than 30 % (SEK type: higher than 50 %)!

8.2 Diagrams for setting feed capacity

General

- ▶ Open out the page showing the diagram of your pump type (see appendix).
- ▶ Calculate the correction factor. Mark the operating pressure for your application in the diagram “correction factor depending upon operating pressure”.
- ▶ Trace a line from this value vertically up to the curve and then horizontally left. Read off the correction factor.
- ▶ Divide the required feed rate by the correction factor determined as above. Mark this value (l/h) on the “l/h” axis in the diagram “feed rate depending upon stroke length and stroke rate”.
- ▶ Trace a line horizontally from this value to the left. Trace a line from the intersection with the straight line for the adjustable stroke frequencies vertically downwards to the “stroke length” axis.
- ▶ Set the gamma/ L to one of the stroke frequencies determined in this way, and the corresponding stroke length.

The measurements for determining the feed rate for the following diagrams were carried out using water and the correction factor was determined at a 70 % stroke length. Distribution of the feed rate across all material versions: -5 to +15 %.

9 Operating

This section describes all operating options available to you when the gamma/ L is in continuous display mode (no P key symbol in the LCD display).

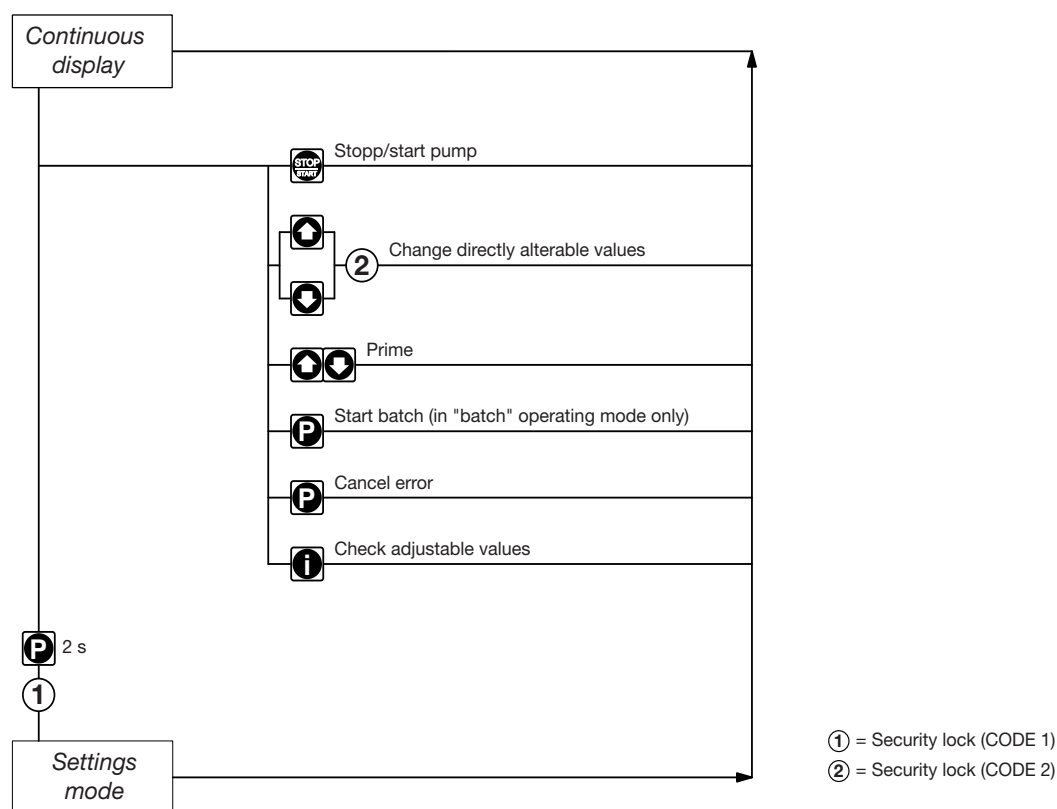
GUIDELINE

- Open out the fold-out page following the title page fully! There you will find the overviews “control elements and key functions” and “operating settings diagram”.
- Look at the overview “continuous displays”. This page shows you which displays are available in which operating mode, and which values are directly alterable in the corresponding continuous displays.

9.1 Manual operation

<i>Set stroke length</i>	Stroke length is continually adjustable within a range of 0 - 100 %. The recommended stroke length range, which will practically guarantee technical reproducibility, is 30 - 100 % (SEK type: 50 - 100 %). The following operating options are available via the different keys (see also figure on the next page):
<i>Stop/Start gamma/ L</i>	To stop gamma/ L: press STOP/START key. To start gamma/ L: press STOP/START key.
<i>Start batch</i>	Press the P key briefly in “batch” operating mode.
<i>Load factory settings</i>	Press the P key for 15 s to load factory calibration settings! Current settings will be deleted.
<i>Change to settings mode</i>	When you press the P key for 2 s in any continuous display the gamma/ L will change to settings mode (see section 7). If CODE 1 is set, the code must be entered after pressing the P key.
<i>Check adjustable values</i>	Each time you press the i key you will see a different continuous display. The number of continuous displays depends upon the identity code, the selected operating mode and the connected accessories.
<i>Change directly alterable values</i>	To change a value (see below) directly in the corresponding continuous display, press one of the arrow keys until “set” appears in the LCD display. The delay has been programmed in to prevent inadvertent changing of values. If CODE 2 has been set, this code must be entered after pressing the arrow key. Directly alterable values are as follows:

- Stroke rate** In “manual”, “contact” and “batch” operating modes:
The stroke rate can be altered in the “stroke rate” display.
- Feed rate** In “manual” operating mode
The feed rate can be altered in the “feed rate” display.
- Factor** The factor is the number of strokes activated by an external pulse or a press of the P key (in “batch” mode only).
In “contact” and “batch” operating modes:
You can alter the factor from the “remaining strokes” display.
The gamma/ L returns to the original continuous display a few seconds after the factor has been reset.
- Batch size** In “batch” operating mode:
The batch size can be changed from the “batch size/remaining litres” display.
The gamma/ L returns to the original continuous display a few seconds after the batch size has been reset.
- Priming** The “priming” function is activated by pressing both arrow keys at the same time.
- Cancel error** Error messages are cancelled by pressing the P key briefly.



9.2 Remote control

It is possible to control the gamma/ L remotely via a signal cable (see section 6.3 and section 7 and appendix documentation).

10 Maintenance

Maintenance intervals

- Every quarter, when subject to normal usage (continuous operation - approx. 30 %)
- Shorter intervals when subject to heavier usage (e.g. continuous operation)

Maintenance actions

Standard liquid ends:

- ▶ Check the diaphragm for damage (see section 11)
- ▶ Check chemical seepage at vent hole
- ▶ Check that the discharge tubing is connected firmly to the liquid end
- ▶ Check that discharge and suction valves are firmly fixed
- ▶ Check that the liquid end is generally watertight (especially vent hole! See fig. 24)
- ▶ Check for correct feed: run the gamma/ L run for a short period (press both arrow keys together)
- ▶ Check electrical connections for wear
- ▶ Check that liquid end screws are fastened tightly (on coarse/fine bleeding versions, first remove knob and cover)

Screw fastening torque:

Liquid end dia. 70 mm:	2,5 to 3 Nm
Liquid end dia. 90 mm and dia. 100 mm:	4,5 to 5 Nm

GUIDELINE

- For PP liquid end, check fastening torque every quarter!

Additionally, for liquid ends with coarse/fine bleed function and SEK type:

- Check that the bypass tubing is connected firmly to the liquid end
- Check that the bleed valve is firmly fixed in place
- Examine the discharge and bypass tubing for kinks
- Check that the coarse/fine bleed function is working correctly

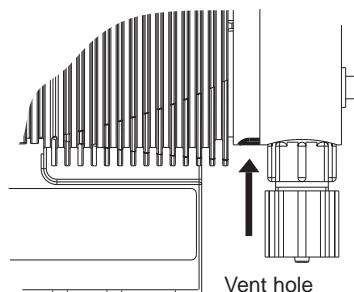


Fig. 24

11 Repairs

GUIDELINE

Repair work that may be carried out by authorised personnel only, or on factory premises:

- Replacement of damaged mains cables
- Replacement of fuses and electronic controller.

Please contact your nearest ProMinent branch or representative!

When sending the pump for repair make sure it is clean and that the liquid end has been thoroughly rinsed out (see section 13)! If, despite careful emptying and cleaning, safety precautions are still required for handling the gamma/ L, the necessary information must be entered in the safety declaration!

The safety declaration is a component of the inspection/repair order.

An inspection or repair can only be carried out when a safety declaration has been correctly and completely filled out by an authorised and qualified member of staff from the company operating the pump.

A form is included in the appendix.

**WARNING**

Pumps used for radioactive materials cannot be returned to ProMinent after use! They will not be accepted by ProMinent!

Repairs: These should only be carried out by qualified personnel (in accordance with Safety section):

- Cleaning the valve
- Changing the diaphragm

**WARNING**

- **Always take suitable precautions when using hazardous chemicals!**
- **Ensure equipment is de-pressurised**

Cleaning the discharge valve (PP, PC, NP) for types 1000, 1005, 1605, 1601, 1602

GUIDELINE

- Discharge and suction valves are different! Dismantle one after the other to avoid confusion.
- Only use new parts, which fit your valve (in shape and chemical resistance)!
- The pump must be reset after replacing a valve.

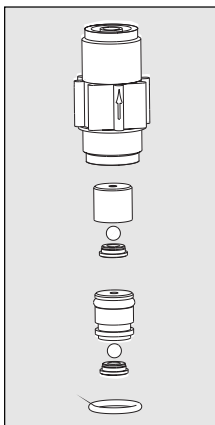


Fig. 25

- ▶ Loosen the hose.
- ▶ Unscrew the discharge valve from the liquid end and rinse thoroughly.
- ▶ Remove the O-ring from the liquid end with a small screw driver.
- ▶ Insert an Allen key or similar into the smaller hole of the pressure connector and push out the valve inserts.
- ▶ Remove the valve seats with a small screwdriver and allow the valve balls to drop out.
- ▶ Clean all parts
- ▶ Drop the valve balls into the valve seats and push on the valve inserts
- ▶ Press the valve seats into the pressure connector with their smaller hole in the direction of the flow (see direction of arrows on the fluting on the pressure connector)
- ▶ Insert the O-ring into the liquid end
- ▶ Screw the valve in as far as it will go
- ▶ Secure the hose

Cleaning the suction valve (PP, PC, NP) for types 1000, 1005, 1605, 1601, 1602

Dismantling, cleaning and reassembly of the suction valve is practically the same as for a discharge valve.

Take care however that:

- both valve inserts are actually identical
- an additional spacer is found under the valve inserts
- in the liquid end a shaped seal is used instead of an O-ring
- the flow direction of the suction connection is reversed as for the pressure connector.

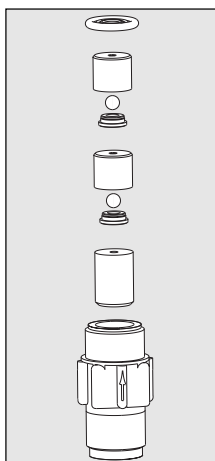


Fig. 26

Cleaning the discharge valve (PP, PC, NP) for types 0708, 1008, 0220, 0420, 0413, 0713, 0232

GUIDELINE

- Discharge and suction valves are different! Dismantle one after the other to avoid confusion!
- Only use new parts, which fit your valve (in shape and chemical resistance)!
- The pump must be reset after replacing a valve.

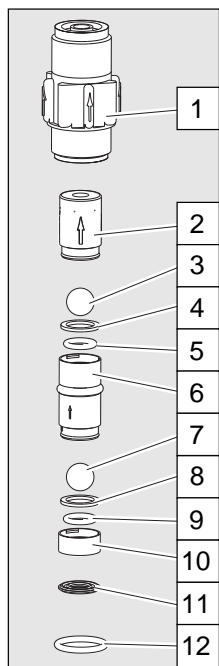


Fig. 27

- ▶ Loosen the hose.
- ▶ Unscrew the discharge valve from the liquid end and rinse thoroughly.
- ▶ Remove the O-ring (12) and the shaped seal (11) from the liquid end with a small screwdriver.
- ▶ Insert an Allen key or similar into the smaller hole of the pressure connector (1) and push out the valve inserts (2, 6).
- ▶ Separate the two valve inserts (2, 6) and let the valve ball (3) drop out.
- ▶ Remove the valve seat (10) from the “valve insert” (6) and let the valve ball (7) drop out.
- ▶ Remove the washers (4, 8) and the O-rings (5, 9) from the “valve insert” (8) and the valve cap (10) with a small screwdriver.
- ▶ Clean all parts.
- ▶ Put one of the washers (4, 8) and one of the O-rings (5, 9) into the “valve insert” (6) and the valve cap (10) respectively.
- ▶ Place the valve balls (3, 7) onto the washers (4, 8) in the “valve insert” and the valve cap (10) respectively.
- ▶ Push the valve cap (10) onto the “valve insert” (6) until it engages.
- ▶ Push the valve insert (2) onto the “valve insert” (6) until it engages.
- ▶ Insert both valve inserts into the pressure connector (1), (check that the directions of the arrows on the fluting of the pressure connector (1) and on the valve inserts (2, 6) are the same!)
- ▶ Insert the O-ring (12) and the shaped seal (11) into the liquid end.
- ▶ Screw the valve in as far as it will go.
- ▶ Secure the hose.

Cleaning the suction valve (PP, PC, NP) for types 0708, 1008, 0220, 0420, 0413, 0713, 0232

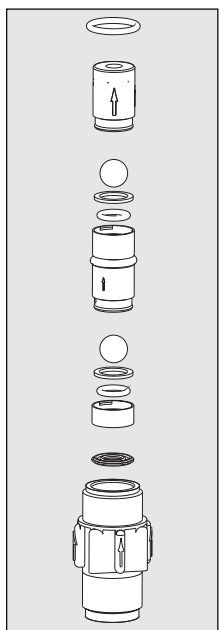


Fig. 28

Dismantling, cleaning and reassembling of a suction valve is practically the same as for a discharge valve. Please ensure, however, that:

- the shaped seal is placed in the suction connector
- only the O-ring is inserted into the liquid end and not the shaped seal
- the flow direction for the suction connector is reversed as for the pressure connector

Change diaphragm

**WARNING**

- **Always take suitable precautions when using hazardous chemicals!**
- **Ensure that the equipment is de-pressurised!**

- ▶ Empty the liquid end (turn the unit upside down and let the feed chemical run out, rinse with a suitable material: rinse the liquid end thoroughly after use with hazardous materials!).
- ▶ When gamma/ L is running set the stroke length to 0 % (the drive axis is then set).
- ▶ Switch off the gamma/ L.
- ▶ Unscrew the hydraulic connectors from the discharge and suction side.
- ▶ For versions with coarse/fine bleed function: firstly pull out the coarse/fine bleed (knob), then lift off the cover from the liquid end using a screwdriver.
- ▶ Remove the screws (1).

For pump types 0220, 0232 and 0420 see the following page (4 holes on the diaphragm rim)!

Standard types

- ▶ Loosen the liquid end (2) and the top plate (4) from the pump housing (6) (loosen only!).
- ▶ Hold the housing (6) in one hand and with the other, clamp the diaphragm (3) between the liquid end (2) and the top plate (4); release the diaphragm (3) from the drive spindle with a light anticlockwise turn of the liquid end (2) and top plate (4).
- ▶ Unscrew the diaphragm (3) completely from the drive spindle.
- ▶ Remove the top plate (4) from the housing (6).
- ▶ Check the condition of the safety diaphragm (5) and replace if necessary.
- ▶ Push the safety diaphragm (5) only as far onto the drive axis until it lies flat on the pump housing (6) – no further!
- ▶ Screw the new diaphragm (3) carefully up to the stop on the drive axis – this must be exact to ensure correct metering!
- ▶ Screw the diaphragm (3) tight once more.
- ▶ Position the top plate (4) on the pump housing (6).

**TAKE CARE**

- **The leakage hole must point downwards when the pump is fully assembled (see fig. 23).**
- **Position the top plate (4) correctly on the pump housing (6). Do not distort the top plate on the pump housing, otherwise the safety diaphragm (5) will not fit.**

- ▶ Lay the diaphragm (3) into the top plate (4).
- ▶ Hold the top plate (4) and screw the diaphragm (3) in a clockwise direction until it is firmly in position (you will feel the resistance of the return spring).

**TAKE CARE**

- **Do not overtighten the diaphragm (3) (particularly on type 1601).**
- **The top plate (4) must remain in position to prevent the safety diaphragm (5) from distorting.**

- ▶ Place the liquid end (2) with the screws (1) on the diaphragm (3) and the top plate (4) (the priming connector must point downwards once the pump is fully assembled).
- ▶ Screw on screws (1) lightly and tighten (starting torque, see below).
- ▶ For versions with coarse/fine bleed function, ensure that the liquid end cover engages in the liquid end, then push the coarse/fine bleed vent (knob) into the liquid end.

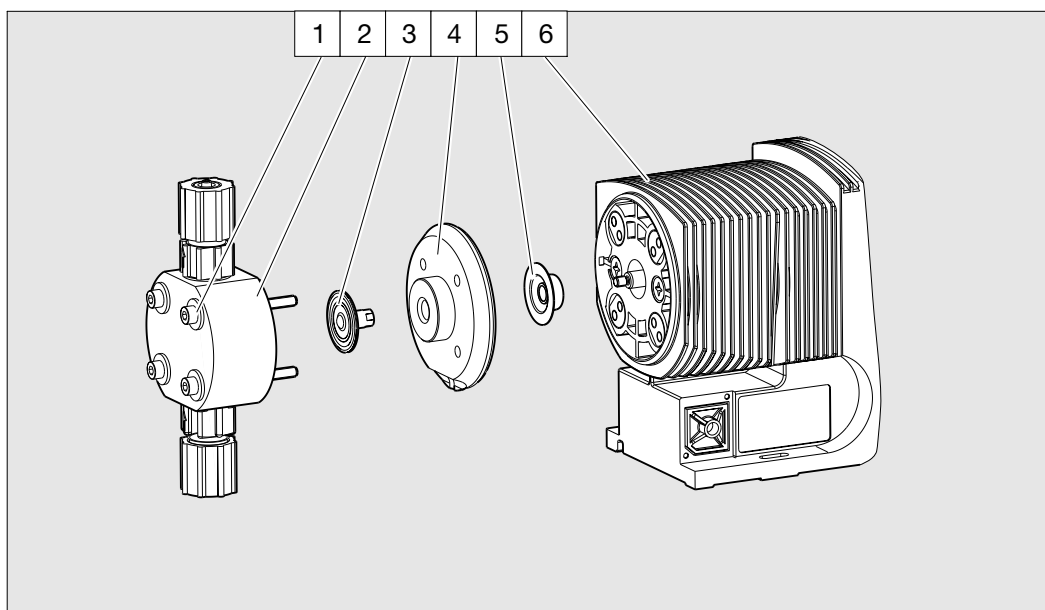


Fig. 29

- | | |
|--------------|--------------------|
| 1 Screws | 4 Top plate |
| 2 Liquid end | 5 Safety diaphragm |
| 3 Diaphragm | 6 Pump housing |

GUIDELINE

- Check the screw torques after 24 hours in operation
- For PP liquid ends check the screw torques again after three months.

Screw torques:

- | | |
|----------------------------------|-------------|
| Liquid end Ø 70 mm: | 2,5 to 3 Nm |
| Liquid end Ø 90 mm and Ø 100 mm: | 4,5 to 5 Nm |

Liquid ends - types 0220, 0232 and 0420

- ▶ Remove the liquid end (2) with screws from the top plate (4) and pump housing (6) about 5 mm - the screws should still be located in the holes but not in the top plate (4).
- ▶ Hold the housing (6) in one hand and with the other hand, clamp the diaphragm (3) between the liquid end (2) and the top plate (4); release the diaphragm (3) from the drive spindle with a light anti-clockwise turn of the liquid end (2) and top plate (4).
- ▶ Remove the liquid end (2) with screws (1) from of the diaphragm and unscrew completely from the drive spindle.
- ▶ Remove the top plate (4) from the housing (6).
- ▶ Screw the new diaphragm (3) onto the drive spindle gently as far as it will go - otherwise the gamma/ L will not meter correctly!
- ▶ Unscrew the diaphragm (3) again.
- ▶ Replace the top (4) plate onto the housing (6).
- ▶ Check the condition of the safety diaphragm (5) and replace if necessary.
- ▶ Push the safety diaphragm (5) only as far onto the drive axis until it lies flat on the pump housing (6) – no further!
- ▶ Screw the new diaphragm (3) carefully up to the stop on the drive axis – this must be exact to ensure correct metering!
- ▶ If not, start the pump and set the stroke length to 100 %.
- ▶ When the pump is running, turn the diaphragm (3) slowly in a clockwise direction until the four holes in the diaphragm are flush with those on the pump housing (6).
- ▶ Hold the diaphragm (3) in this position, set the stroke length to 0 % and stop the pump.
- ▶ Screw the diaphragm (3) tight once more.
- ▶ Position the top plate (4) on the pump housing (6).

**TAKE CARE**

- The leakage hole must point downwards when the pump is fully assembled (see fig. 23).
 - Position the top plate (4) correctly on the pump housing (6). Do not distort the top plate on the pump housing, otherwise the safety diaphragm (5) will not fit.
- ▶ Lay the diaphragm (3) into the top plate (4).
- ▶ Hold the top plate and screw the diaphragm (3) in a clockwise direction until it is firmly in position (you will feel the resistance of the return spring).

**TAKE CARE**

- Do not overtighten the diaphragm (3).
 - The top plate (4) must remain in position to prevent the safety diaphragm (5) from distorting.
- ▶ The top plate (4) must remain in position to prevent the safety diaphragm (5) from distorting.
- ▶ Position the liquid end (2) with the screws (1) on the diaphragm (3) and the top plate (4) (the priming connector must point downwards once the pump is fully assembled).
- ▶ Screw on screws (1) lightly and tighten (starting torque, see above).
- ▶ For coarse/fine bleed versions: ensure the liquid end cover engages in the liquid end, then push the coarse/fine bleed (knob) into the liquid end.

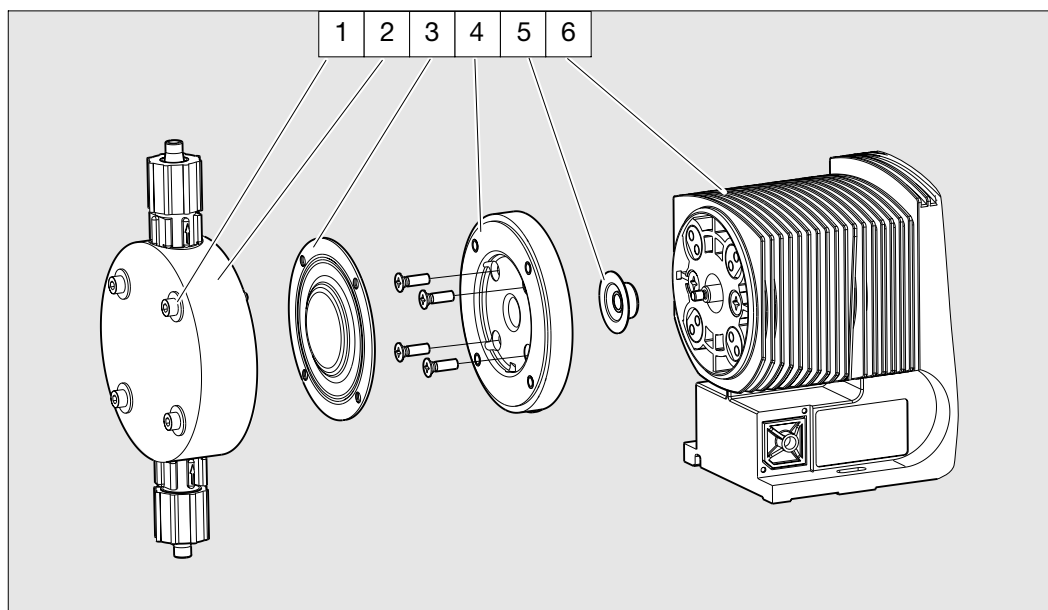


Fig. 30

- | | |
|--------------|--------------------|
| 1 Screws | 4 Top plate |
| 2 Liquid end | 5 Safety diaphragm |
| 3 Diaphragm | 6 Pump housing |

GUIDELINE

- Check the screw torque after 24 hours in operation!
- For PP liquid ends recheck the screw torque after three months!

12 Troubleshooting



WARNING

- Always take suitable precautions when using hazardous chemicals!
- Ensure the equipment is de-pressurised before working on the pump!

gamma/ L does not prime despite full stroke and bleed function

- Cause* Crystalline deposits on the ball seat because valves have dried out
- Remedy*
- ▶ Remove the suction sleeve from the chemical supply container and rinse out the liquid end thoroughly
 - ▶ If still unsuccessful, dismantle valves and clean (see section 10)

Fluid is seeping from the top plate

- Cause* The liquid end is not sealed against the pump diaphragm
- Remedy*
- ▶ Tighten screws in the liquid end (see section 10)
 - ▶ If unsuccessful, replace the diaphragm (see section 11)

Green LED indicator (operating display) is not lit

- Cause* Incorrect or no mains voltage
- Remedy*
- ▶ Use the recommended mains voltage as given in the voltage specification on the nameplate

Error Messages

Red LED display is lit, "Error" and "MINIM" flash in the display

- Cause* Fluid level in the chemical storage tank has reached "liquid level low, stage 2"
- Remedy*
- ▶ Fill the chemical supply container

Red LED display is lit, "Error" and "ANALG" flash in the display

- Cause* gamma/ L is in "analogue" operating mode, a fault routine has been programmed in the ANALOGUE menu and the operating current has fallen below 3.8 mA
- Remedy*
- ▶ Remedy low operating current
 - ▶ Switch fault routine "OFF" (see Section 7.4.2.)

Red LED display is lit, "Error" and "CNTCT" flash in the display

- Cause* gamma/ L is in "contact" or "batch" operating mode and the extended function "memory" has been set.
In addition a very large factor has been entered, too many contacts have been input or the P-key has been pressed too often, resulting in an overflow of the stroke memory.
- Remedy*
- ▶ Press the P-key
 - ▶ Change gamma/ L set up

Red LED display is lit, "Error" and "FLOW" flash in the display

- Cause* Dosing monitor not properly connected
- Remedy*
- ▶ Connect dosing monitor properly
 - ▶ Press P-key
- Cause* Dosing monitor has reported more defective strokes than have been set in the FLOW menu
- Remedy*
- ▶ Press P-key
 - ▶ Investigate the cause and remedy

All other Errors

Please contact your ProMinent branch or representative!

Fault Signals

Yellow LED display is lit

Cause Liquid level in chemical storage tank has reached “liquid level low, stage 1”

Remedy ▶ Fill chemical storage tank

Yellow LED Display is lit and “calib” flashes

Cause The pump is calibrated and the stroke length deviates by more than $\pm 10\%$ from the value at the time of calibration.

Remedy ▶ Reset the stroke length or calibrate the pump again to the desired stroke length

13 Decommissioning and Disposal

Decommissioning



WARNING

- When decommissioning the gamma/ L the housing and, in particular, the liquid end must be thoroughly cleaned to remove chemicals and dirt!
 - Always take suitable precautions when using hazardous chemicals!
 - Ensure that the equipment is de-pressurised!
- ▶ Disconnect the gamma/ L from the power supply
 - ▶ Empty the liquid end by turning the gamma/ L upside down and allow the feed chemical to pour out
 - ▶ Rinse the liquid end with a suitable material, thoroughly rinse the liquid end after use with hazardous materials!

If decommissioning is only temporary, maintain the correct storage conditions:

Storage temperature: -10 to +50 °C

Air humidity: < 92 % relative humidity

Disposal



TAKE CARE

Electronic waste is classified as special waste!

Please observe all locally applicable directives!

Technical Data

14 Technical Data

14.1 Performance data and weights

gamma/ L

at 180 strokes/minute and 100% stroke length

Liquid end type	Max. feed rate at maximum operating pressure			Ma. feed rate at medium operating pressure			Connector size outer Ø x inner Ø	Suction lift*	Priming lift**	Admiss. priming pressure	Ship. Wt ¹
	bar	l/h	ml/str.	bar	l/h	ml/str.						mm	m Wg	m Wg	bar	approx. kg
1000	10	0.74	0.09	5	0.82	0.076	6x4	6	1.8	8	2.9 / 3.6
1601	16	1.1	0.10	8	1.4	0.13	6x4	6	2	8	2.9 / 3.6
1602	16	2.1	0.19	8	2.5	0.24	6x4	6	2	5.5	2.9 / 3.6
1005	10	4.4	0.41	5	5.0	0.46	8x5****	5	3	3	3.1 / 4.5
0708	7	7.1	0.66	3.5	8.4	0.78	8x5	4	2	2	3.1 / 4.5
0413	4	12.3	1.14	2	14.2	1.31	8x5	3	2	1.5	3.1 / 4.5
0220	2	19.0	1.76	1	20.9	1.94	12x9	2	2	1	3.1 / 4.5
1605	16	4.1	0.38	8	4.9	0.45	8x5****	4	3	3	4.5 / 5.9
1008	10	6.8	0.63	5	8.3	0.76	8x5	3	3	2	4.5 / 5.9
0713	7	11.0	1.02	3.5	13.1	1.21	8x5	3	3	1.5	4.5 / 5.9
0420	4	17.1	1.58	2	19.1	1.77	12x9	3	3	1	5.5 / 8.6
0232	2	32.0	2.96	1	36.2	3.35	12x9	2	2	0.8	5.5 / 8.6

gamma/ L with self-degassing liquid end ***

at 180 strokes/minute and 100% stroke length

Liquid end type	Max. feed rate at maximum operating pressure			Max. feed rate at medium operating pressure			Connector size outer Ø x inner Ø	Suction lift*	Priming lift**	Admiss. priming pressure	Ship. Wt ²
	bar	l/h	ml/str.	bar	l/h	ml/str.						mm	m Wg	m Wg	bar	approx. kg
1601	16	0.59	0.055	8	0.78	0.072	6x4	–	1.8	0.5	2.9
1602	16	1.4	0.13	8	1.74	0.16	6x4	–	2.1	0.5	2.9
1005	10	3.6	0.33	5	4.0	0.37	8x5	–	2.7	0.5	3.1
0708	7	6.6	0.61	3.5	7.5	0.69	8x5	–	2	0.5	3.1
0413	4	10.8	1.00	2	12.6	1.17	8x5	–	2.5	0.5	3.1
0220	2	16.2	1.50	1	18.0	1.67	12x9	–	2	0.5	3.1
1605	16	3.3	0.31	8	3.8	0.35	8x5	–	3.0	0.5	4.5
1008	10	6.3	0.58	5	7.5	0.69	8x5	–	3.0	0.5	4.5
0713	7	10.5	0.97	3.5	12.3	1.14	8x5	–	2.5	0.5	4.5
0420	4	15.6	1.44	2	17.4	1.61	12x9	–	2.5	0.5	4.5

* Lift when suction line and liquid end are full

** Priming lift with clean and wetted valves, priming lift at 100% stroke length and free flow or opened bleed valve

*** The feed rate values are for minimum feed rates, based on water

**** For material versions SST : 6 x 4 mm

¹ For material versions PPE, PPB, PCE, PCB, NPE, NPB, TTT/SST

² For material versions PPE, PPB, NPE, NPB

14.2 Dosing reproducibility

Standard Liquid ends

Dosing precision
Reproducibility

-5 to +10% at max. stroke length and max. operating pressure for all materials.
±2 % at constant conditions and minimum 30 % stroke length.

Self-degassing liquid ends

Since self-degassing liquid ends are filled with air bubbles when in contact with gaseous chemicals and when in operation, no dosing reproducibility values can be given.
The recommended minimum stroke length with self-degassing liquid ends is 50 %.

14.3 Viscosity

The liquid ends are designed for liquids up to a maximum viscosity of

- 200 mPas for standard liquid ends
- 500 mPas for valves with springs
- 50 mPas for self-degassing liquid ends

14.4 Materials Data for Liquid ends

Version	Liquid end	Valves	Seals	Balls
PPE PPB	PP PP	PP PP	EPDM FPM (Viton®)	Ceramic Ceramic
PCE PCB	PVC PVC	PVC PVC	EPDM FPM (Viton®)	Ceramic Ceramic
NPE NPB	Acrylic glass Acrylic glass	PVC PVC	EPDM FPM (Viton®)	Ceramic Ceramic
TTT	PTFE with carbon	PTFE with carbon	PTFE	Ceramic
SST	Stainless steel 1.4571	Stainless steel 1.4571	PTFE	Ceramic

Viton® (FPM) is a registered trade mark of DuPont Dow Elastomers.

14.5 Electrical Data

Version: 100 - 230 V ± 10 %, 50/60 Hz

Variants 100 - 230 V/AC	gamma/L M70	gamma/L M85
Power rating:	17 W	22 W
Rated current:	0.7 A	1 A
Switch on peak current:	15 A (for approx.1 ms)	15 A (for approx. 1 ms)
Fuse:	0.8 AT	0.8 AT

Note Fuses must display VDE, UL and CSA certification, e.g. type 19195 from Wickmann in accordance with IEC publication 127 - 2/3

14.6 Ambient conditions

<i>Temperatures</i>	Storage and transport temperatures:	-10 to +50 °C
	Feed chemical temperature:	-10 to +35 °C
	Ambient temperature when in operation:	-10 to +45 °C (drive and control)

Maximum ambient temperatures for liquid ends depending on material type:

Max. ambient temperature	PPE, PPB	PCE, PCB	NPE, NPB	TTT	SST
Long-term at max. operating pressure:	50 °C	45 °C*	45 °C	50 °C	50 °C
Short-term (max. 15 min) at max. 2 bar:	100 °C	60 °C	60 °C	120 °C	120 °C

* Under extreme conditions such as maximum dosing temperatures, maximum stroke frequency and maximum operating pressure, leakage can occur on the liquid end at an ambient temperature of 35 °C.

<i>Climate</i>	Permissible air humidity:	92 % relative humidity, not condensing
	Moist and fluctuating air conditions:	FW 24 in accordance with DIN 50016

14.7 Enclosure rating and safety class

Enclosure Rating Contact and moisture enclosure rating: IP 65 in accordance with IEC 529, EN 60529, DIN VDE 0470 Part 1

Safety Requirements Safety Class 1 - Mains connection with earth lead

14.8 Compatibility

The hydraulic parts of the gamma/ L are identical to those of the Beta®.

The following components and accessories for pumps from the product ranges Beta®, CONCEPT, gamma-Classic and gamma are all compatible:

- gamma/Vario signal cable; 2-, 4- and 5 core for "external" function
- 2 stage float switch (gamma/Vario)
- Discharge tubing diameters
- Standard gamma connector set
- gamma wall bracket
- Chemical feed containers and mounting plates
- Total height (distance between suction and discharge connector)
- Distance between the connectors and locating holes on the pumps
- Accessories such as pressure back pressure valve, multifunctional valve, dosing monitor and rinsing equipment

15 Accessories



CAUTION

The fitting and installing of ProMinent® dosing pumps using parts from other suppliers which have not been tested and recommended by ProMinent is inadmissible and can result in harm to personnel and equipment, for which no liability will be accepted.

Level switch

2-stage with 2m connection cable

Fault indicating relay

To signal faults

Fault indicating and pacing relay

For timing other equipment and for indicating faults.

Signal cable

Universal signal cable: 5 core / 2.5 and 10 m

External contact cable: 2 core / 2.5 and 10 m

Foot valves

With suction filter and non-return valve for connection at the end of the suction tubing.

Discharge valve

With spring-loaded non-return valve for dosing into open or closed systems and for connecting discharge tubing.

Discharge lances

For dosing into large pipes and to prevent blockage when dosing crystallising substances.

Back pressure valves

For precision dosing when operating pressure is low or as a relief valve.

Accumulator without diaphragm

For reducing pulsation, e.g. with long dosing lines.

Dosing monitors

For monitoring dosing. After pre-set number of failed strokes the error message displays and the dosing pump switches off.

Suction lances

With foot valve and float switch for disposable drums or chemical feed containers

Chemical feed container

To contain 35 to 1000 litres with lockable screw top and necessary accessories.

Manual/electronic stirrers

For mixing and batching of feed solutions.

Bracket

For stable pump mounting.

PPE, PPB material versions

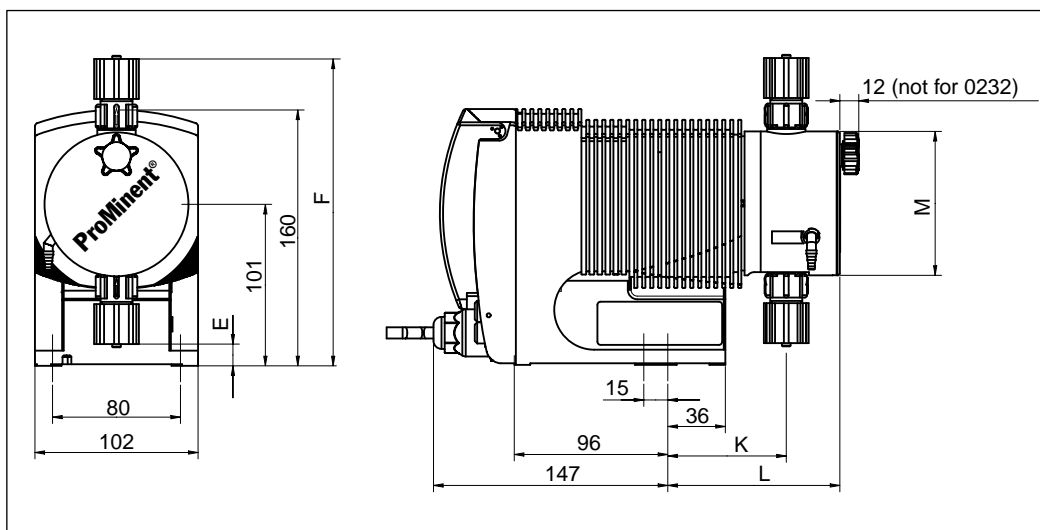


Fig. 31

Measurements in mm

	gamma/ L M70				gamma/ L M85			
	1000 - 1602	1005	0708 - 0413	0220	1605	1008 - 0713	0420	0232
E	23	13	15	15	13	15	15	5
F	186	193	191	191	193	191	191	197
K	71	71	74	76	71	74	76	76
L	106	105	108	110	105	108	110	91
M	Ø 70	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

PCE, PCB material versions

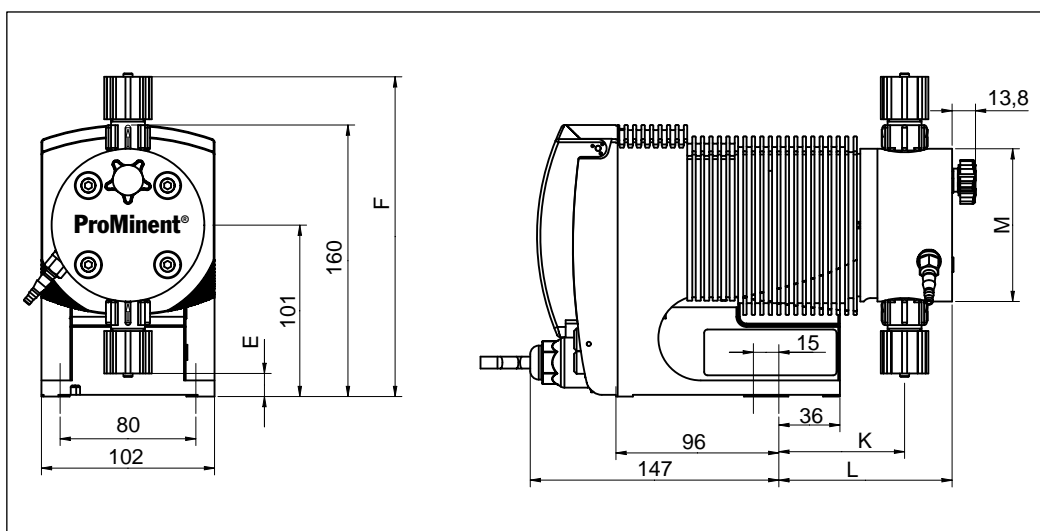


Fig. 32

Measurements in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	0708	0413 - 0220	1605	1008	0713 - 0420	0232
E	25	23	16	13	15	16	13	15	5
F	177	179	188	189	189	188	189	189	199
K	77	77	74	74	76	74	74	76	76
L	105	105	102	102	104	102	102	104	105
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

NPE, NPB material versions (non-bleed)

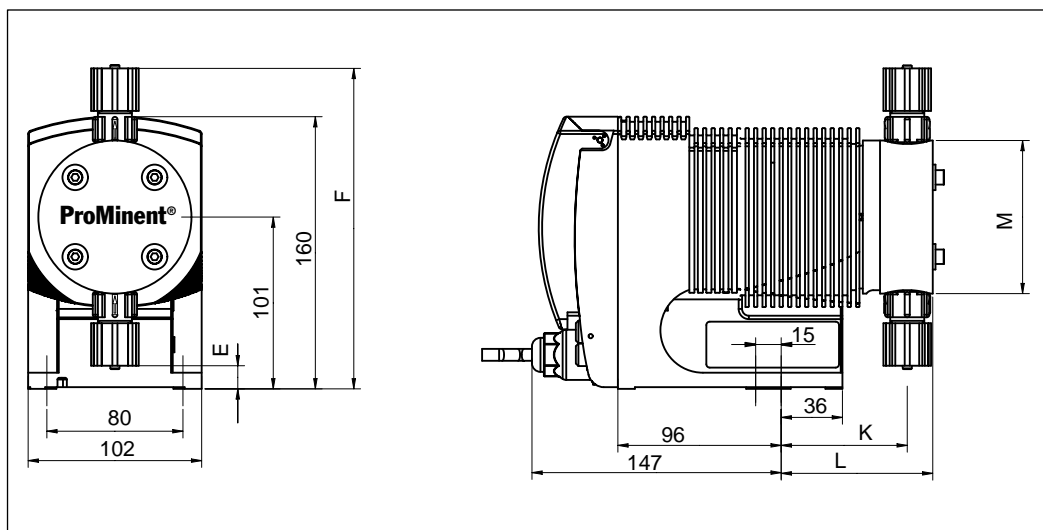


Fig. 33

Measurements in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	0708	0413 - 0220	1605	1008 - 0713	0420	0232
E	25	23	16	15	15	16	15	15	5
F	177	179	188	189	189	188	189	189	199
K	77	77	74	74	76	74	74	76	76
L	92	92	89	89	91	89	89	91	91
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

NPE, NPB material versions (with bleed function)

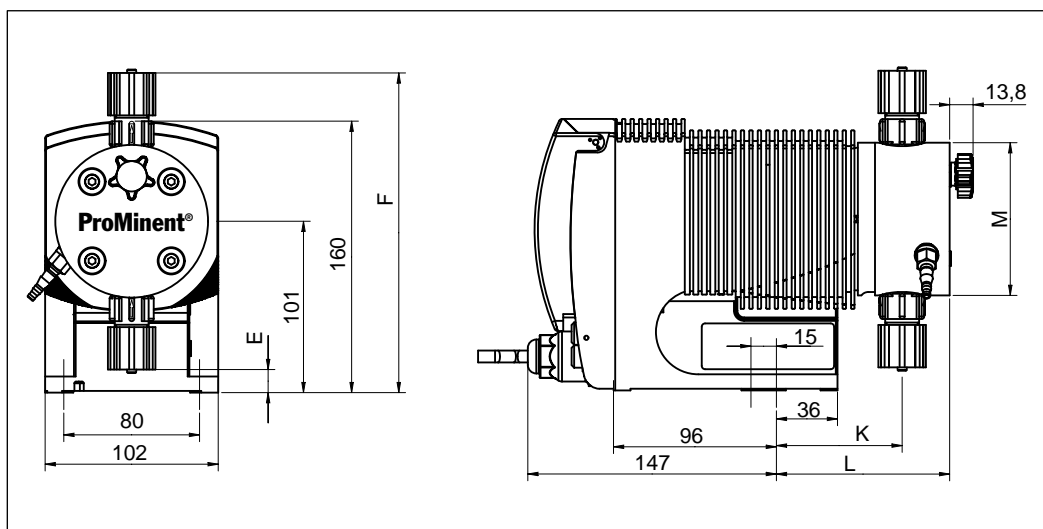


Fig. 34

Measurements in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	0708	0413 - 0220	1605	1008	0713 - 0420	0232
E	25	23	16	13	15	16	13	15	5
F	177	179	188	189	189	188	189	189	199
K	77	77	74	74	76	74	74	76	76
L	105	105	102	102	104	102	102	104	105
M	62 (Ø 70)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 110

gamma/ L Dimensions

PPE, PPB, NPE, NPB, SEK material versions

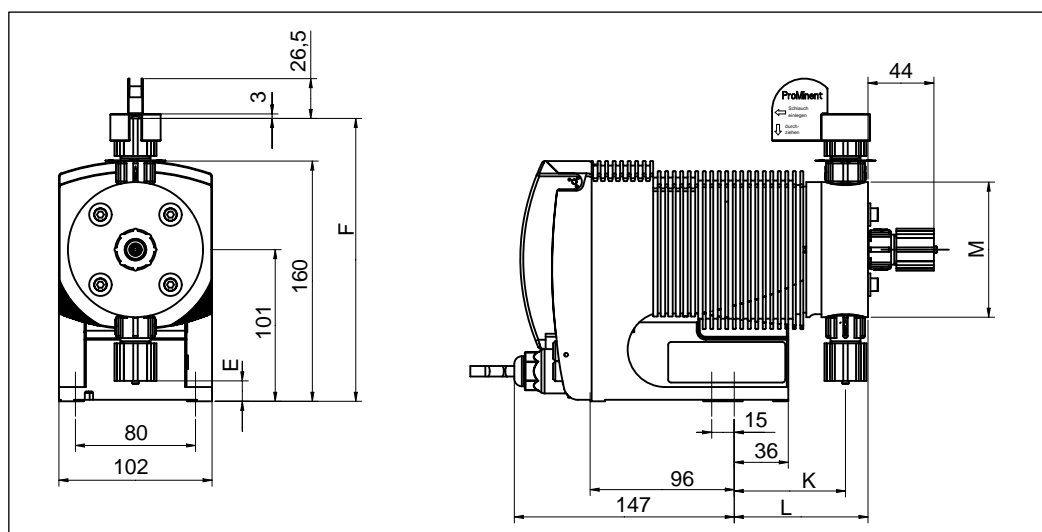


Fig. 35

Measurements in mm

	gamma/ L M70					gamma/ L M85		
	1601	1602	1005	0708	0413 - 0220	1605	1008 - 0713	0420
E	25	23	16	15	15	16	15	15
F	177	179	188	189	189	188	189	189
K	77	77	74	74	76	74	74	76
L	92	92	89	89	91	89	89	91
M	62 (Ø 60)	66 (Ø 70)	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90	Ø 90

TTT material versions

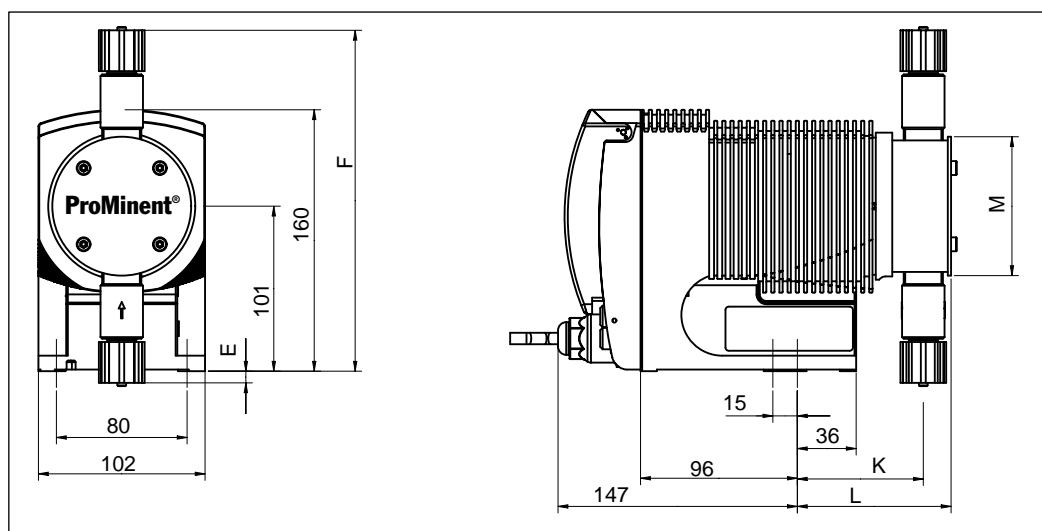


Fig. 36

Measurements in mm

	gamma/ L M70				gamma/ L M85		
	1000 - 1601	1602	1005	0708 - 0220	1605	1008 - 0420	0232
E	32	25	23	-7	23	-7	-15
F	170	178	179	209	179	209	217
K	78	72	75	77	75	75	78
L	91	87	90	95	90	95	97
M	51 (Ø 60)	66 (Ø 70)	68 (Ø 80)	81 (Ø 85)	68 (Ø 80)	81 (Ø 85)	96 (Ø 100)

SST material versions

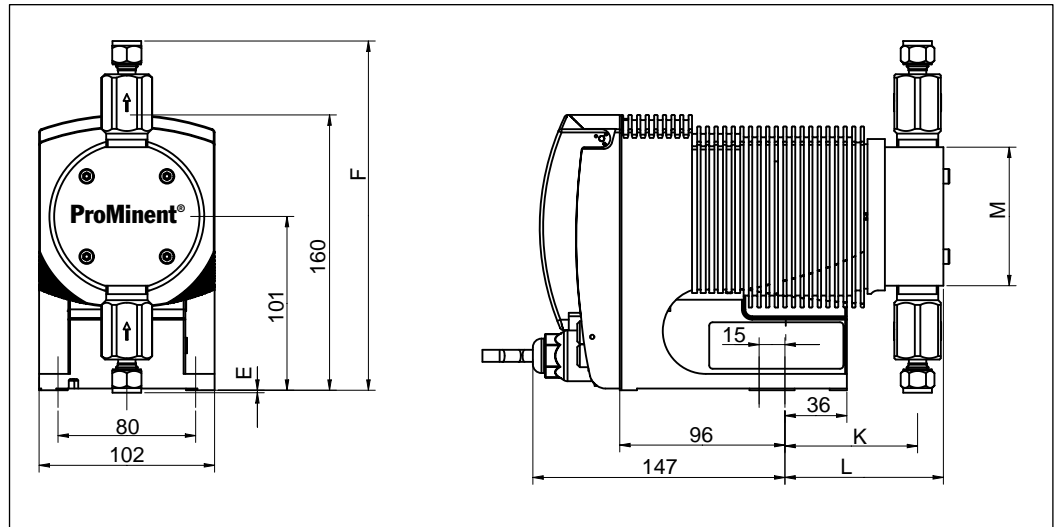


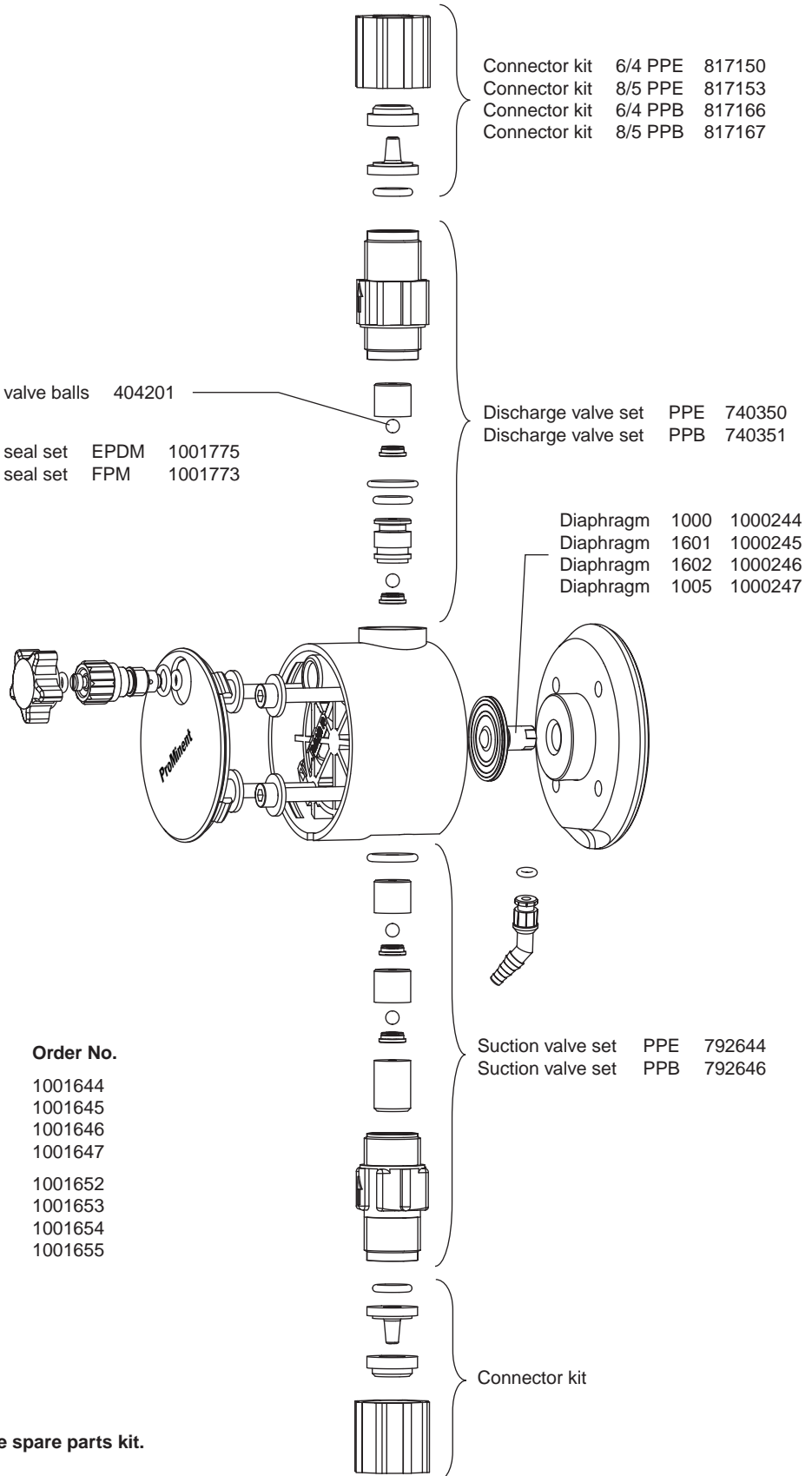
Fig. 37

Measurements in mm

	gamma/ L M70					gamma/ L M85			
	1000 - 1601	1602	1005	0708 - 0413	0220	1605	1008 - 0713	0420	0232
E	40	33	31	-2	-3	31	-2	-3	-10
F	162	170	171	203	204	171	203	204	212
K	78	72	75	77	77	75	77	77	78
L	89	85	88	93	93	88	93	93	95
M	51 (Ø 60)	66 (Ø 70)	68 (Ø 80)	81 (Ø 85)	81 (Ø 85)	81 (Ø 80)	81 (Ø 85)	81 (Ø 85)	96 (Ø 100)

Exploded diagrams of liquid ends

Liquid end 1000 - 1005 (1605) PP with coarse/fine bleed



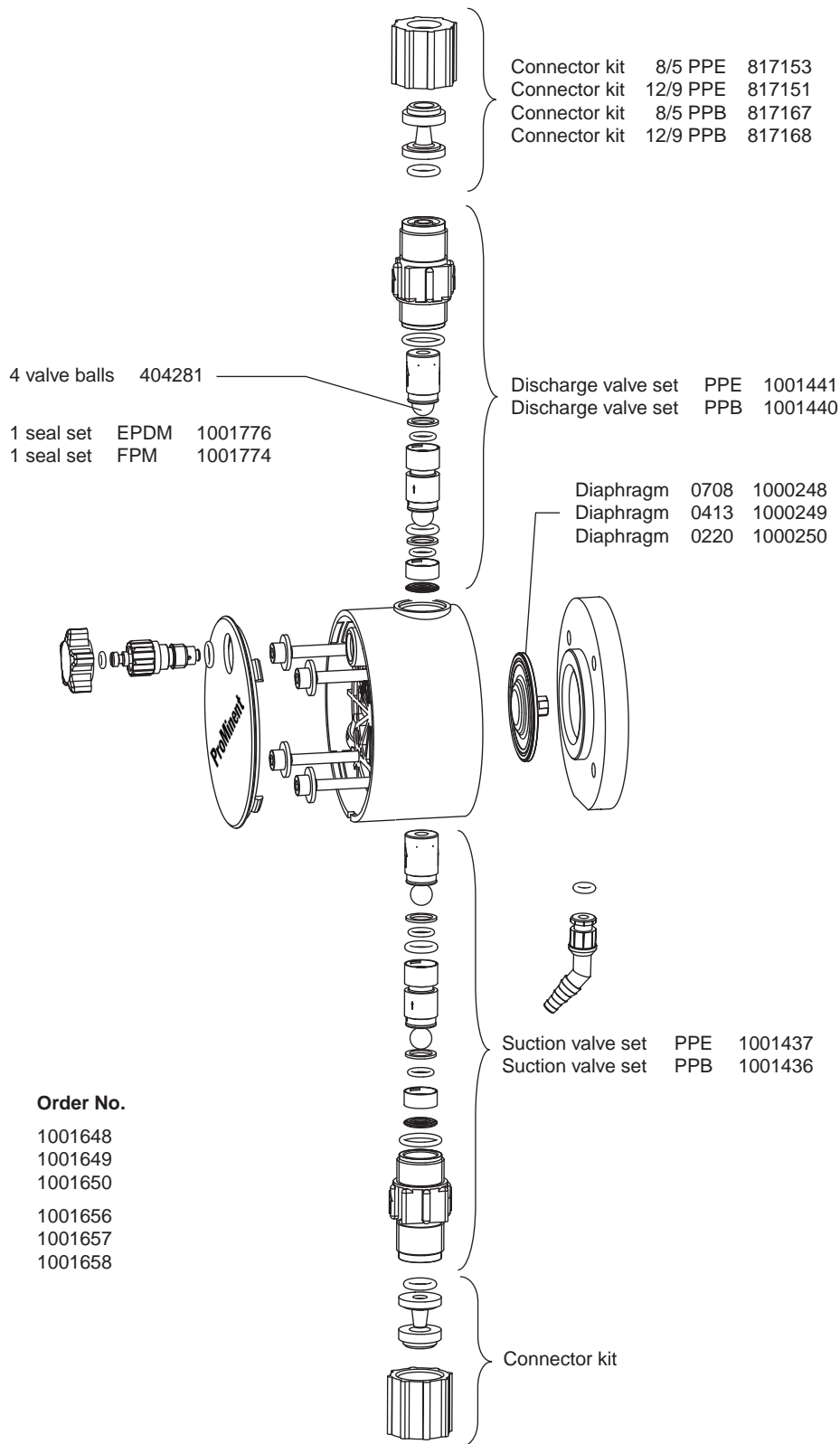
Spare parts kits for:

Type	Material	Order No.
1000	PPE	1001644
1601	PPE	1001645
1602	PPE	1001646
1005 (1605)	PPE	1001647
1000	PPB	1001652
1601	PPB	1001653
1602	PPB	1001654
1005 (1605)	PPB	1001655

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 0708 (1008) - 0220 (0420)
PP with coarse/fine bleed



Spare parts kits for:

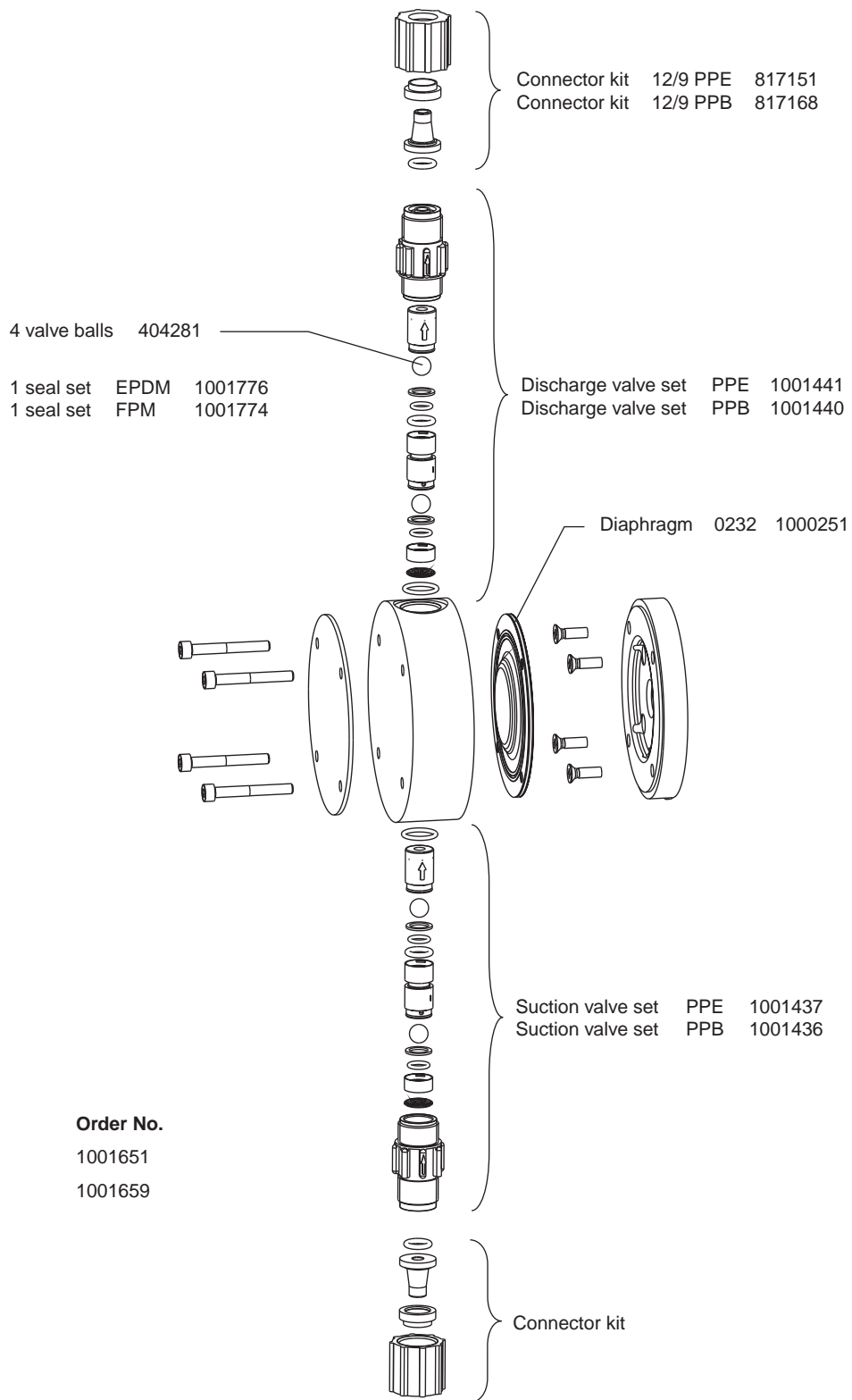
Type	Material	Order No.
0708 (1008)	PPE	1001648
0413 (0713)	PPE	1001649
0220 (0420)	PPE	1001650
0708 (1008)	PPB	1001656
0413 (0713)	PPB	1001657
0220 (0420)	PPB	1001658

The listed items are included in the spare parts kit.

Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 0232 PP without coarse/fine bleed



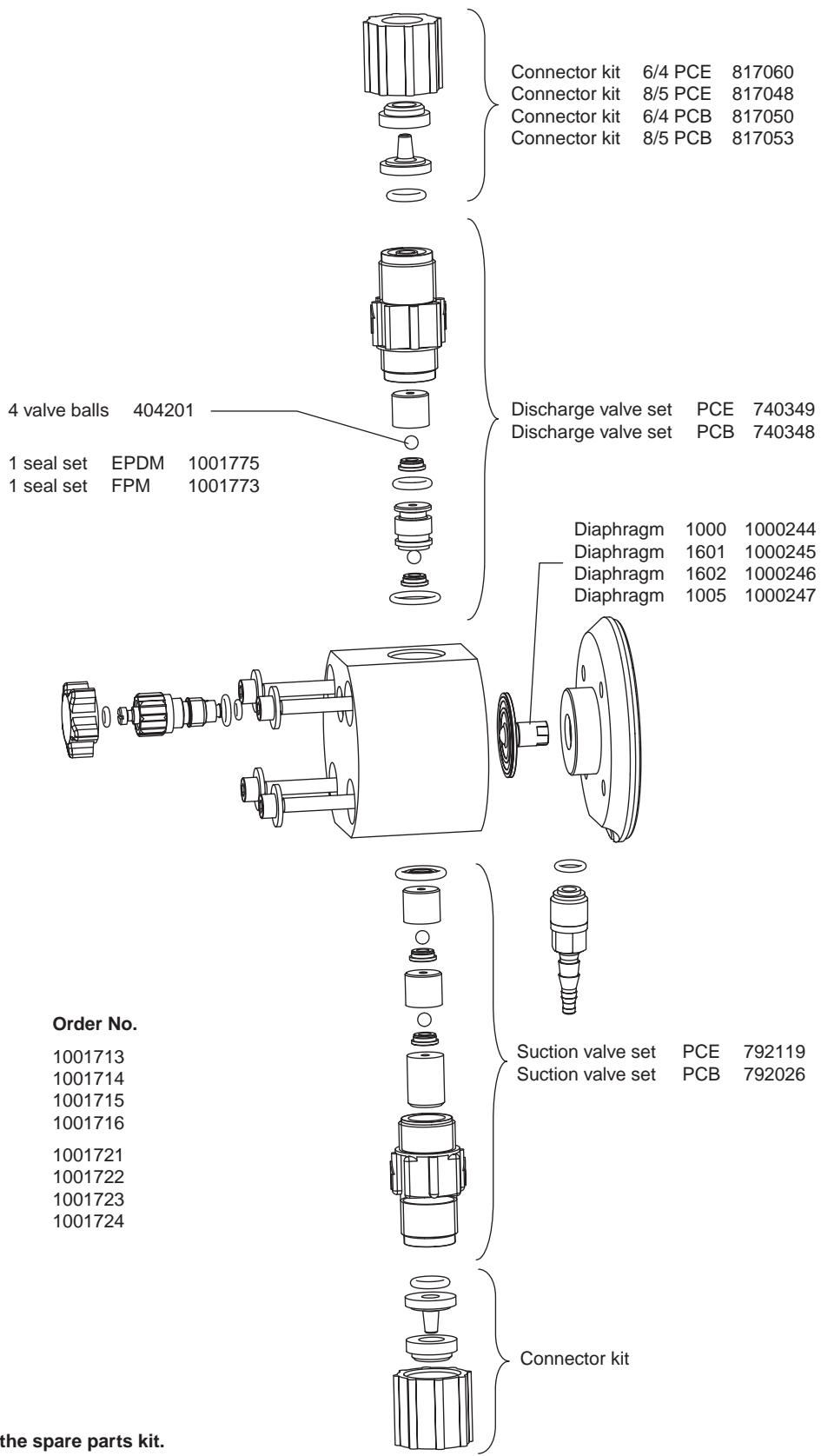
Spare parts kits for:

Type	Material	Order No.
0232	PPE	1001651
0232	PPB	1001659

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 1000 - 1005 (1605)
PC / NP with coarse/fine bleed



Spare parts kits for:

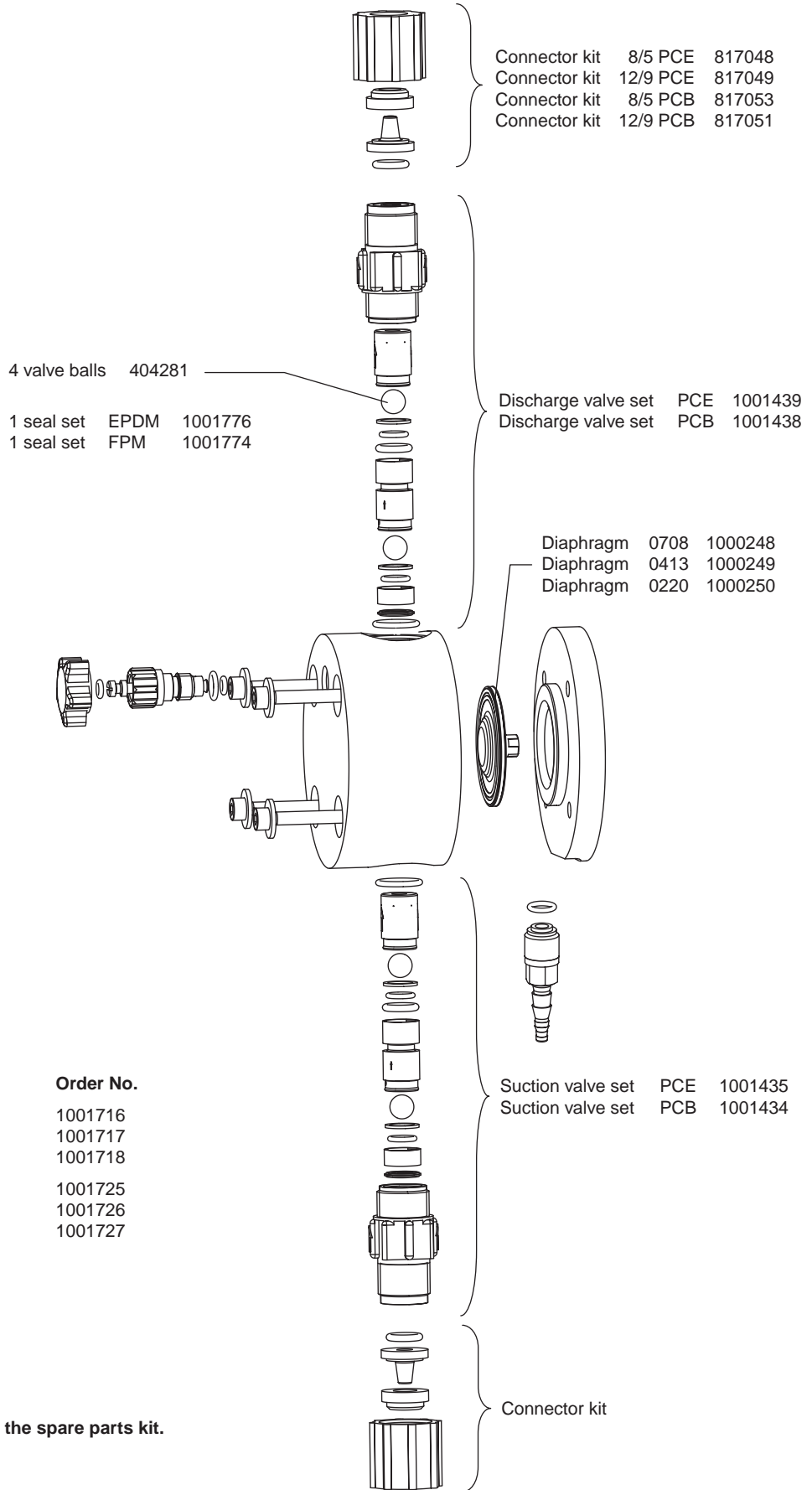
Type	Material	Order No.
1000	PCE / NPE	1001713
1601	PCE / NPE	1001714
1602	PCE / NPE	1001715
1005 (1605)	PCE / NPE	1001716
1000	PCB / NPB	1001721
1601	PCB / NPB	1001722
1602	PCB / NPB	1001723
1005 (1605)	PCB / NPB	1001724

The listed items are included in the spare parts kit.

Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 0708 (1008) - 0220 (0420) PC / NP with coarse/fine bleed



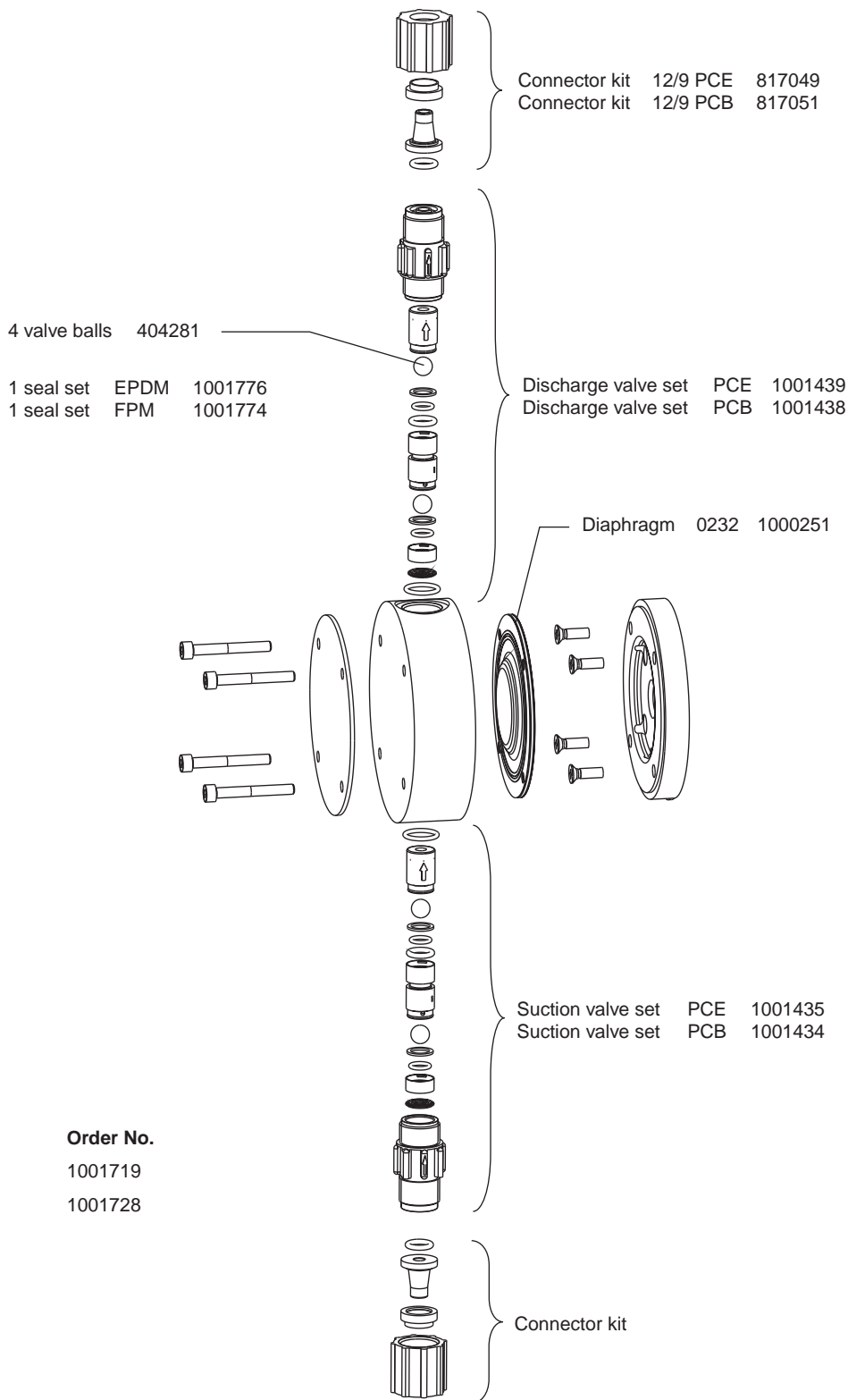
Spare parts kits for:

Type	Material	Order No.
0708 (1008)	PCE / NPE	1001716
0413 (0713)	PCE / NPE	1001717
0220 (0420)	PCE / NPE	1001718
0708 (1008)	PCB / NPB	1001725
0413 (0713)	PCB / NPB	1001726
0220 (0420)	PCB / NPB	1001727

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 0232
PC without coarse/fine bleed



Spare parts kits for:

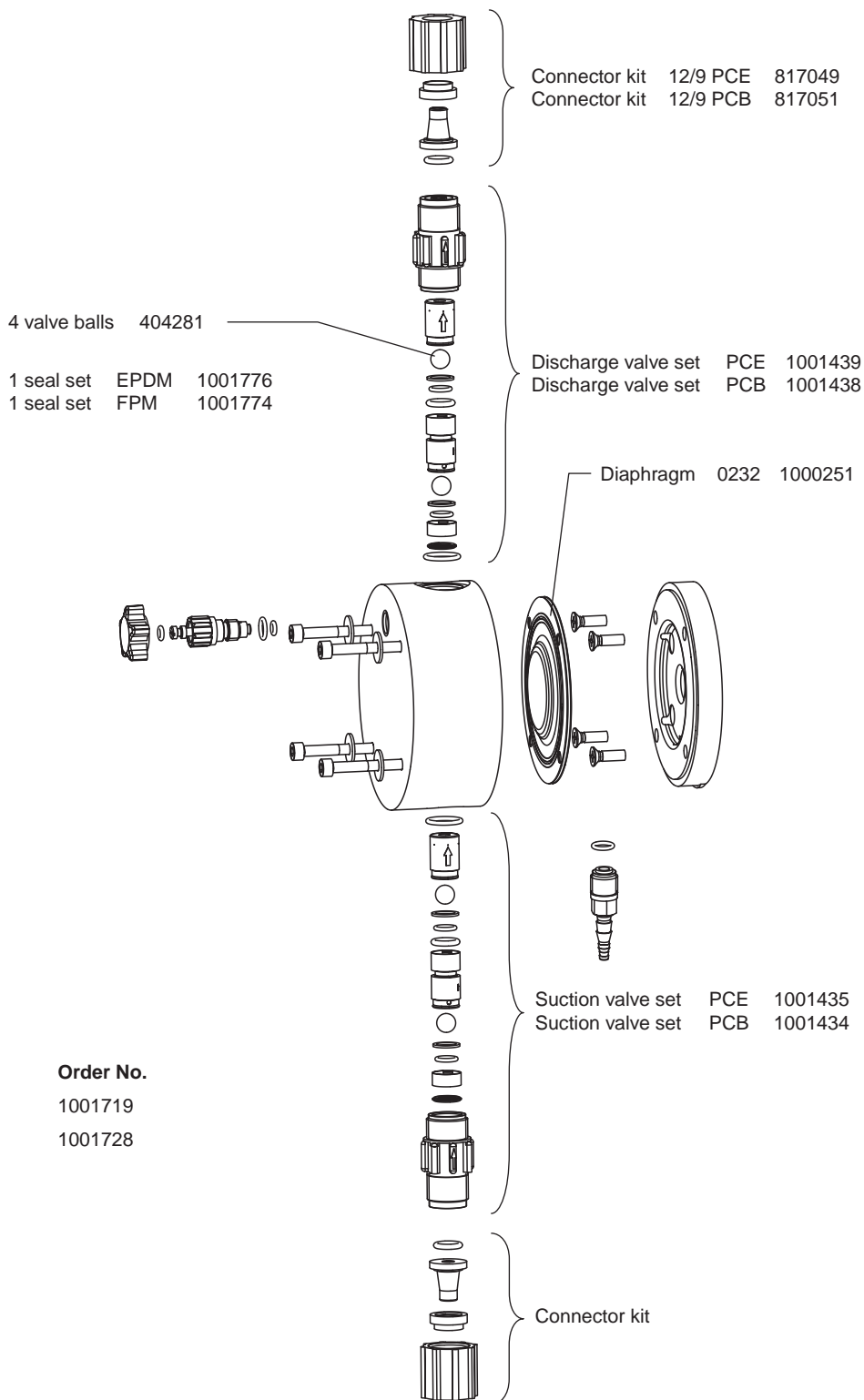
Type	Material	Order No.
0232	PCE / NPE	1001719
0232	PCB / NPB	1001728

The listed items are included in the spare parts kit.

Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 0232 NP with coarse/fine bleed



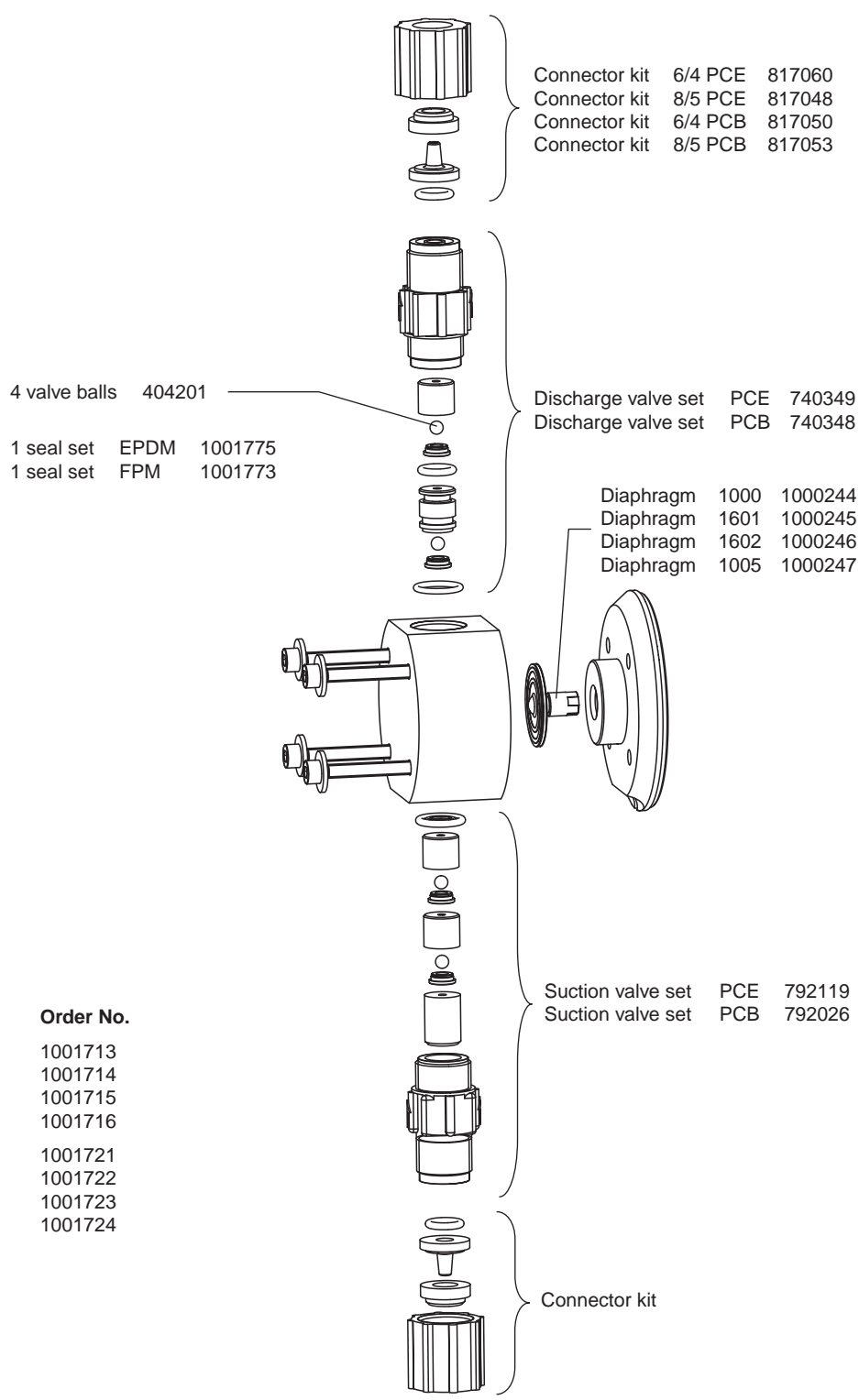
Spare parts kits for:

Type	Material	Order No.
0232	PCE / NPE	1001719
0232	PCB / NPB	1001728

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 1000 - 1005 (1605)
NP without coarse/fine bleed



Spare parts kits for:

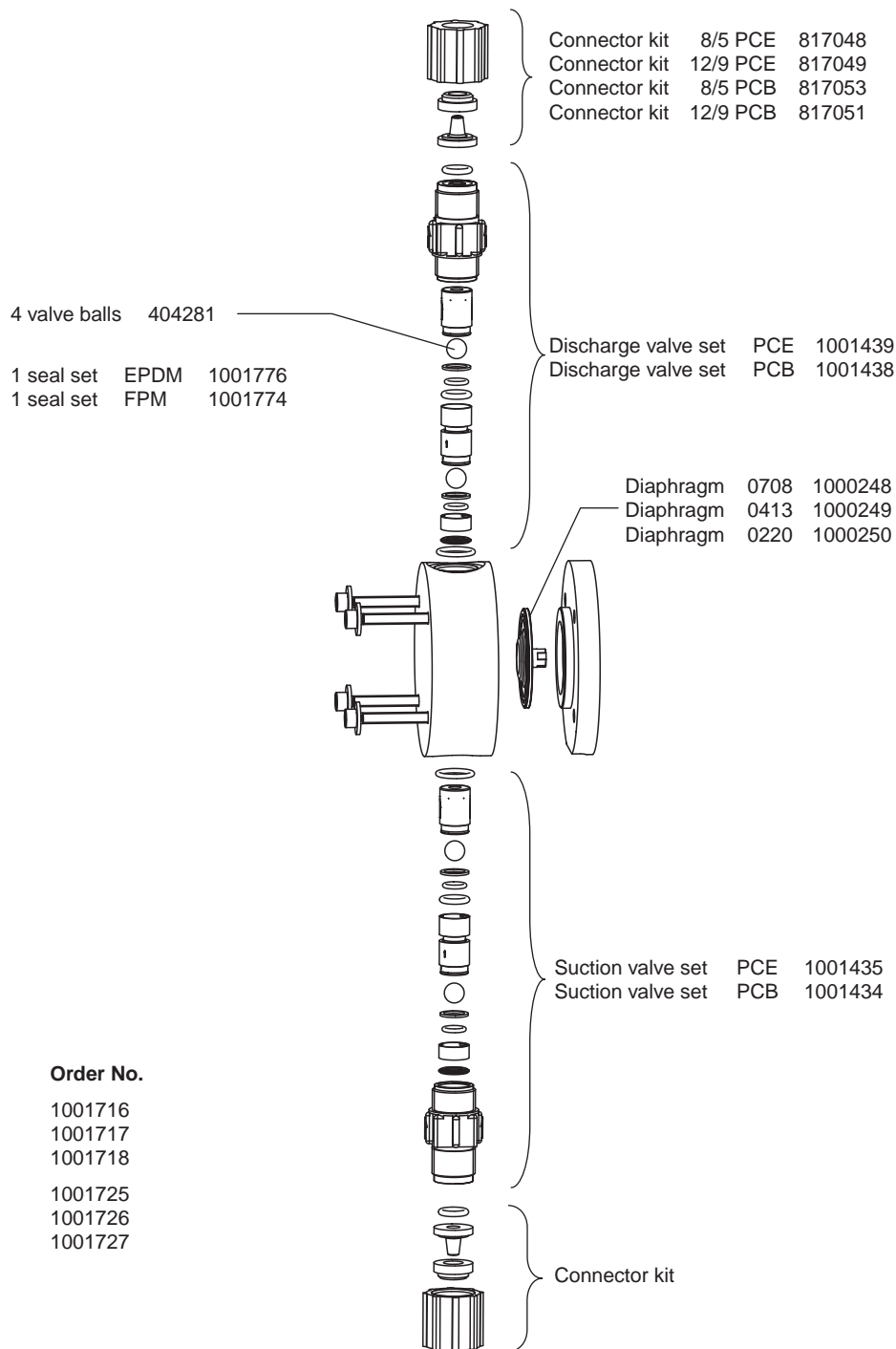
Type	Material	Order No.
1000	PCE / NPE	1001713
1601	PCE / NPE	1001714
1602	PCE / NPE	1001715
1005 (1605)	PCE / NPE	1001716
1000	PCB / NPB	1001721
1601	PCB / NPB	1001722
1602	PCB / NPB	1001723
1005 (1605)	PCB / NPB	1001724

The listed items are included in the spare parts kit.

Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 0708 (1008) - 0220 (0420) NP without coarse/fine bleed



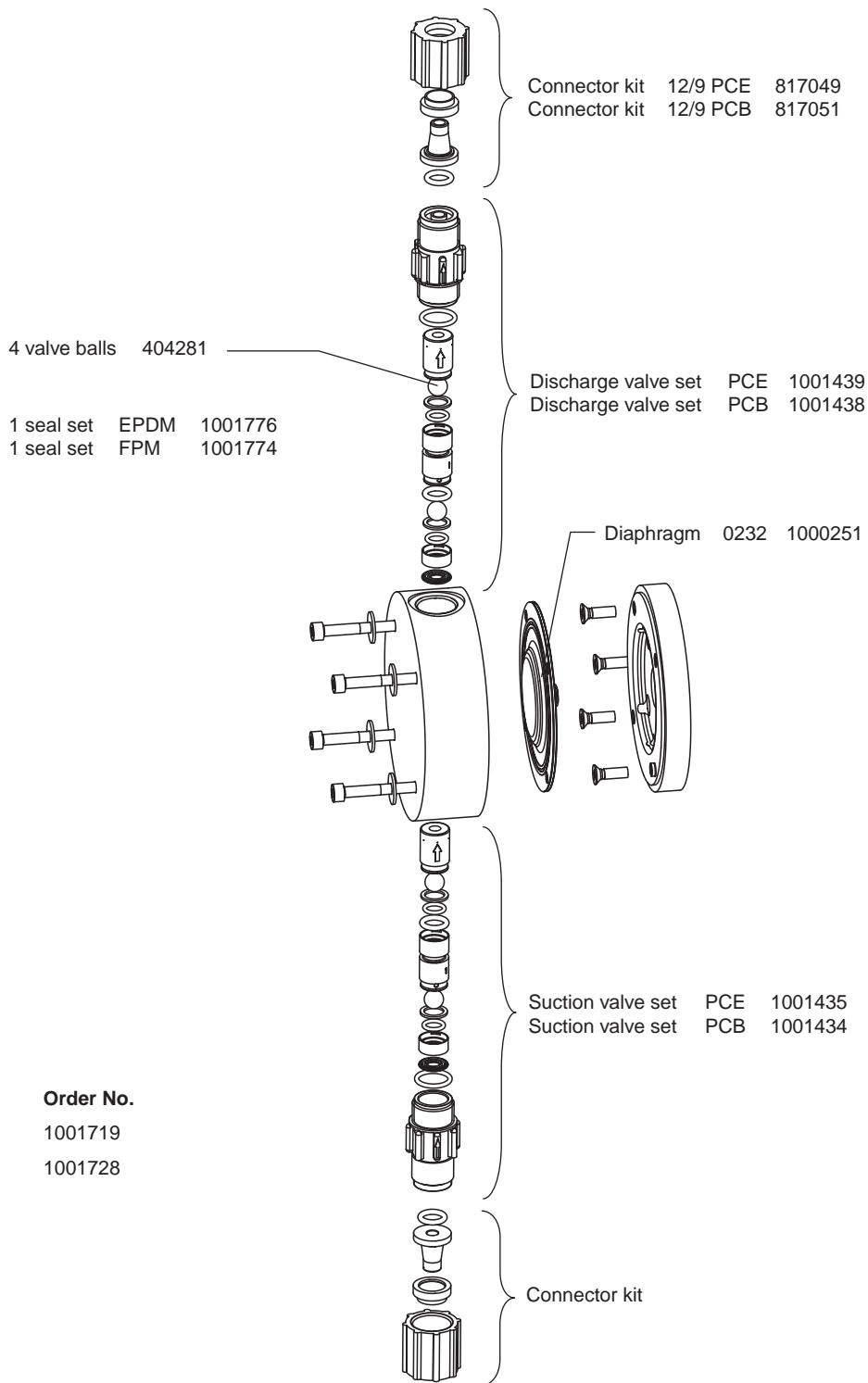
Spare parts kits for:

Type	Material	Order No.
0708 (1008)	PCE / NPE	1001716
0413 (0713)	PCE / NPE	1001717
0220 (0420)	PCE / NPE	1001718
0708 (1008)	PCB / NPB	1001725
0413 (0713)	PCB / NPB	1001726
0220 (0420)	PCB / NPB	1001727

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 0232
NP without coarse/fine bleed



Spare parts kits for:

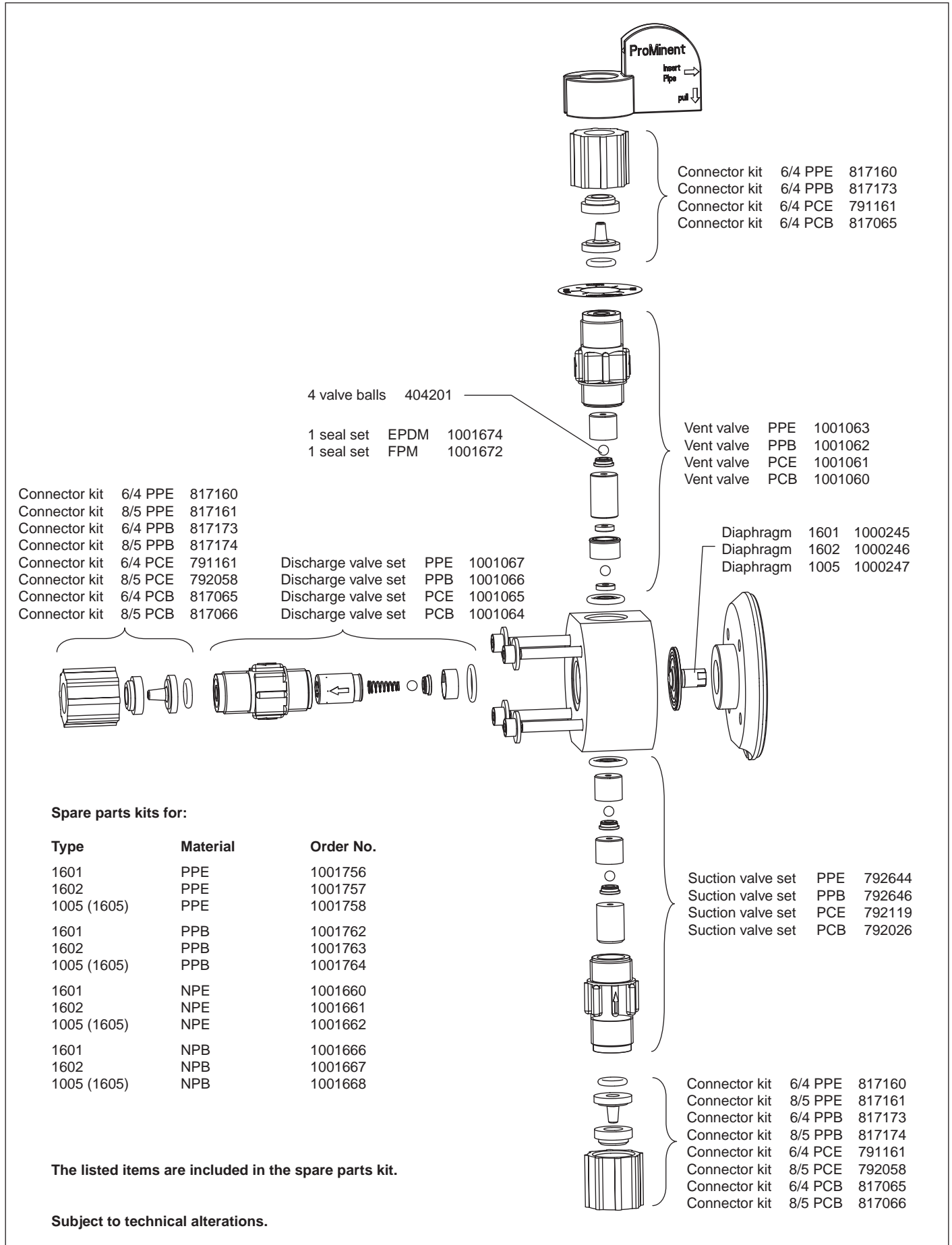
Type	Material	Order No.
0232	PCE / NPE	1001719
0232	PCB / NPB	1001728

The listed items are included in the spare parts kit.

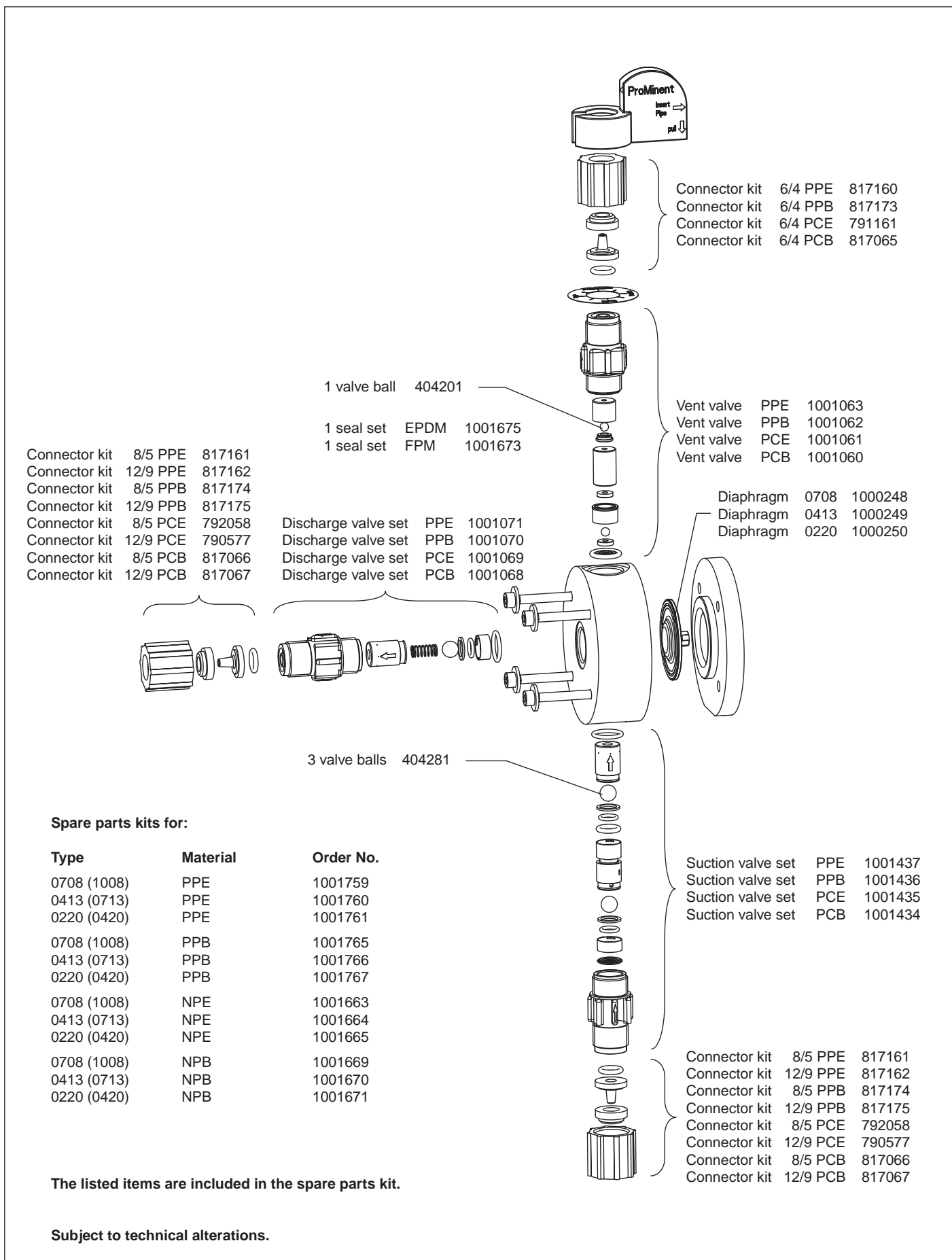
Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 1601 - 1005 (1605) PP / NP self-degassing

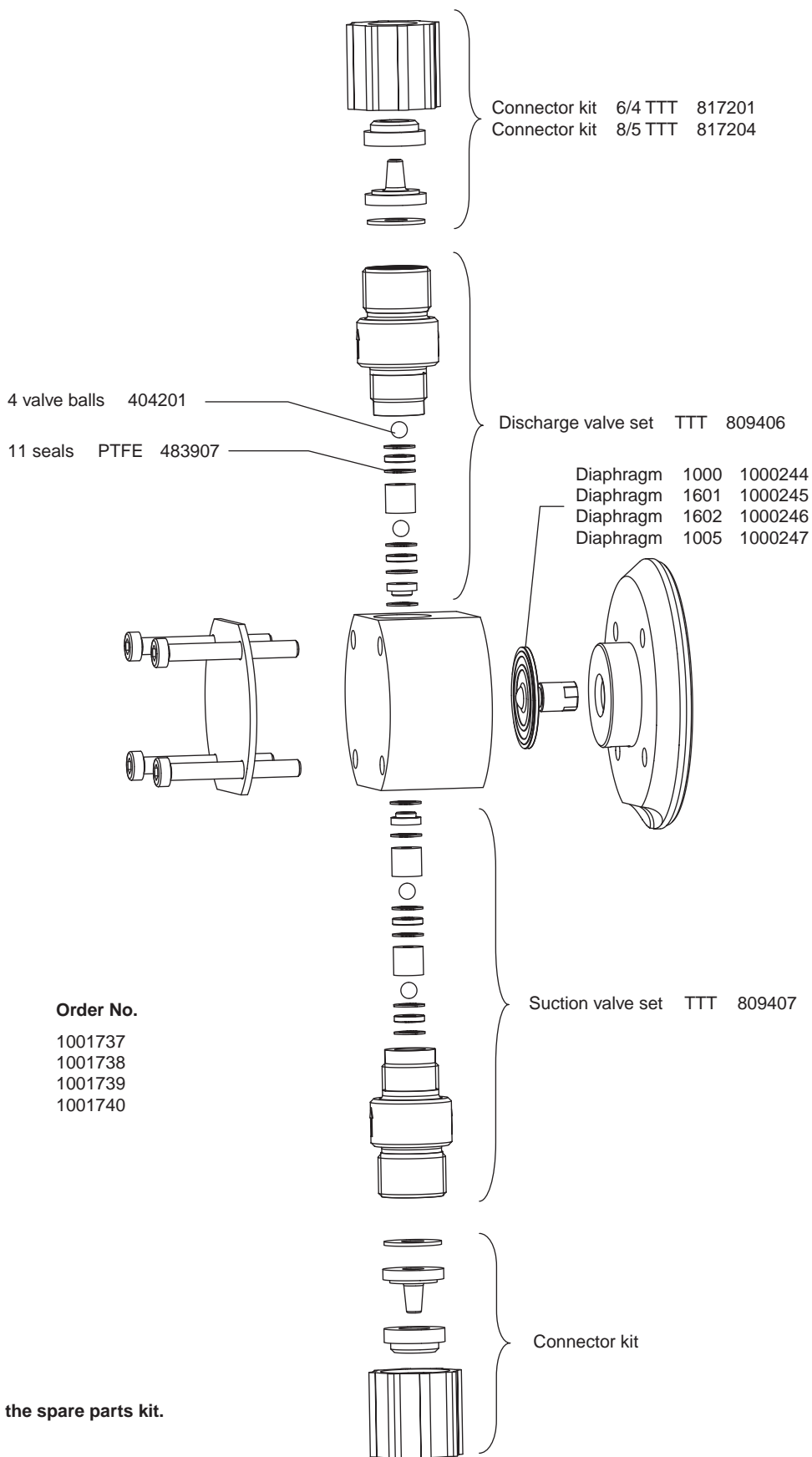


Liquid end 0708 (1008) - 0220 (0420)
PP / NP self-degassing



Exploded diagrams of liquid ends

Liquid end 1000 - 1005 (1605) TT



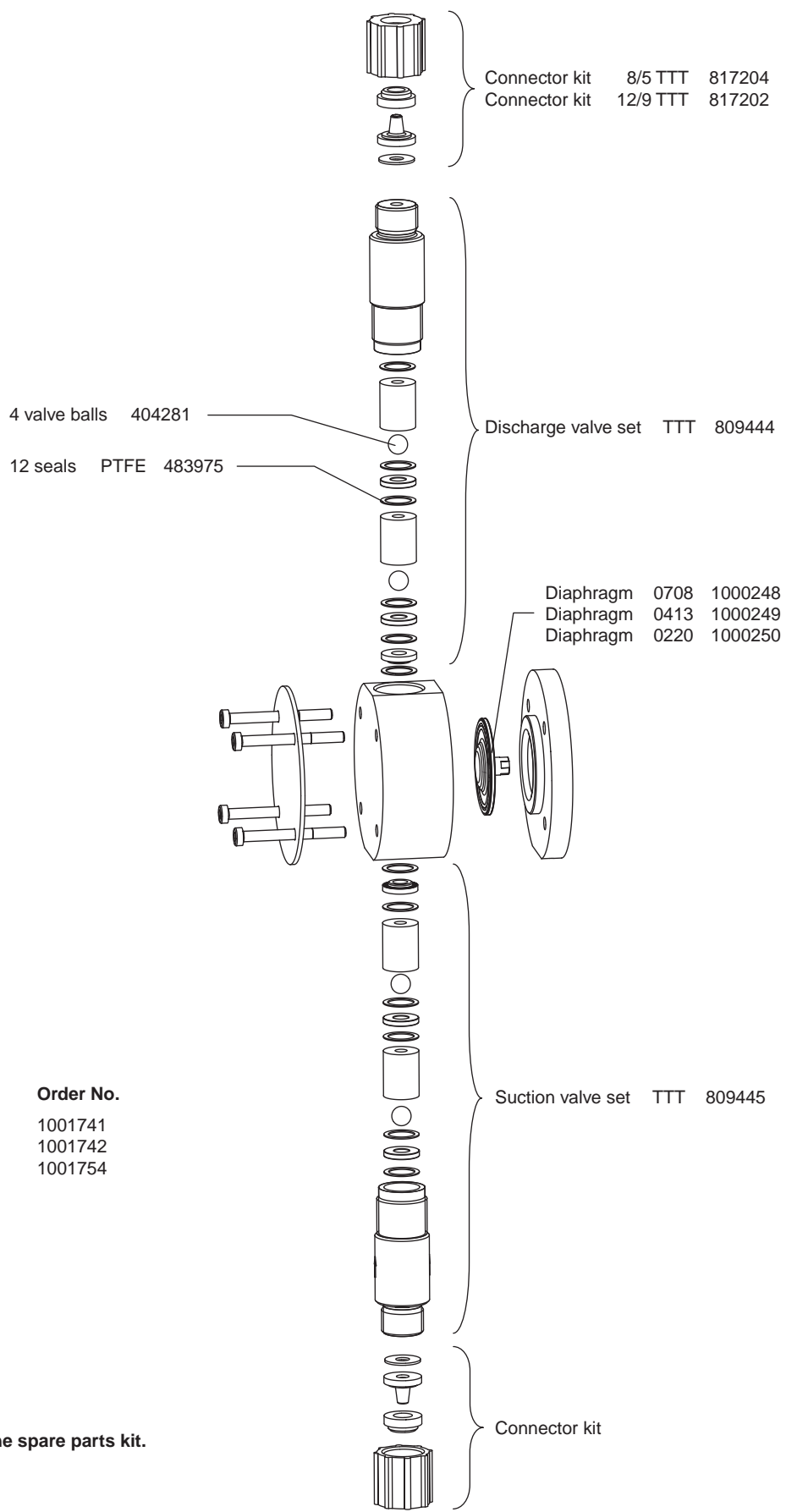
Spare parts kits for:

Type	Material	Order No.
1000	TTT	1001737
1601	TTT	1001738
1602	TTT	1001739
1005 (1605)	TTT	1001740

The listed items are included in the spare parts kit.

Subject to technical alterations.

Liquid end 0708 (1008) - 0220 (0420)
TT



Spare parts kits for:

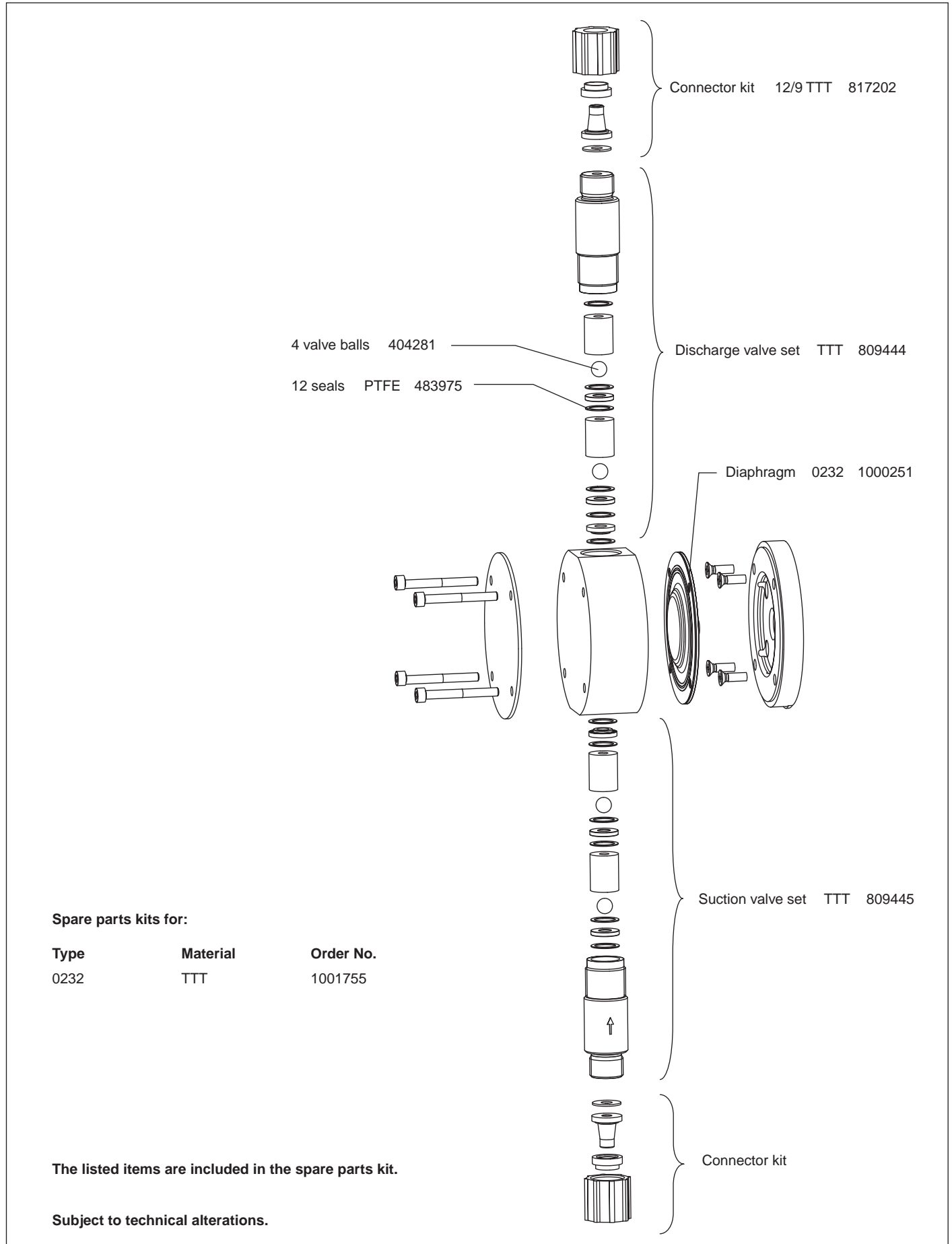
Type	Material	Order No.
0708 (1008)	TTT	1001741
0413 (0713)	TTT	1001742
0220 (0420)	TTT	1001754

The listed items are included in the spare parts kit.

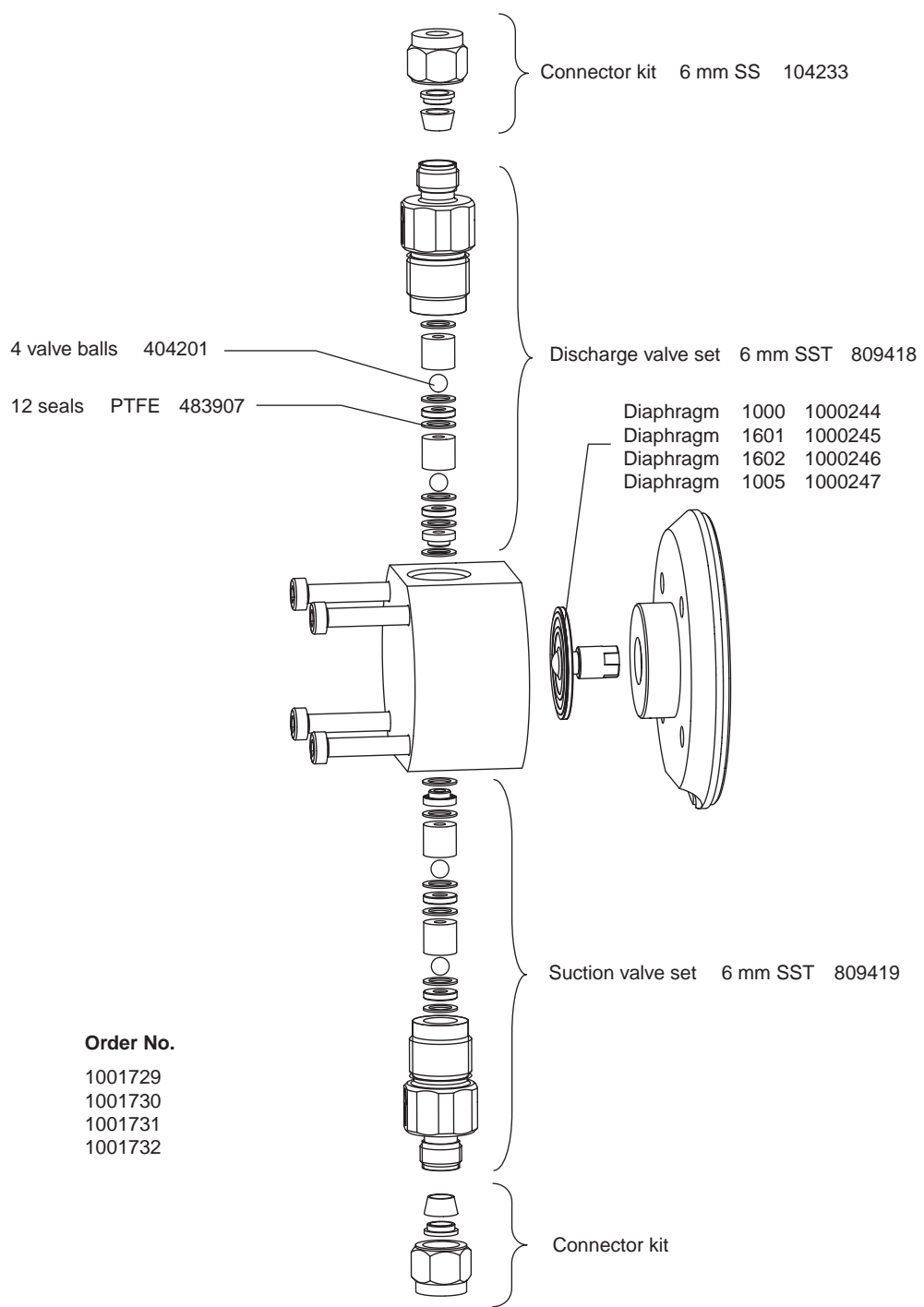
Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 0232 TT



Liquid end 1000 - 1005 (1605)
SS



Spare parts kits for:

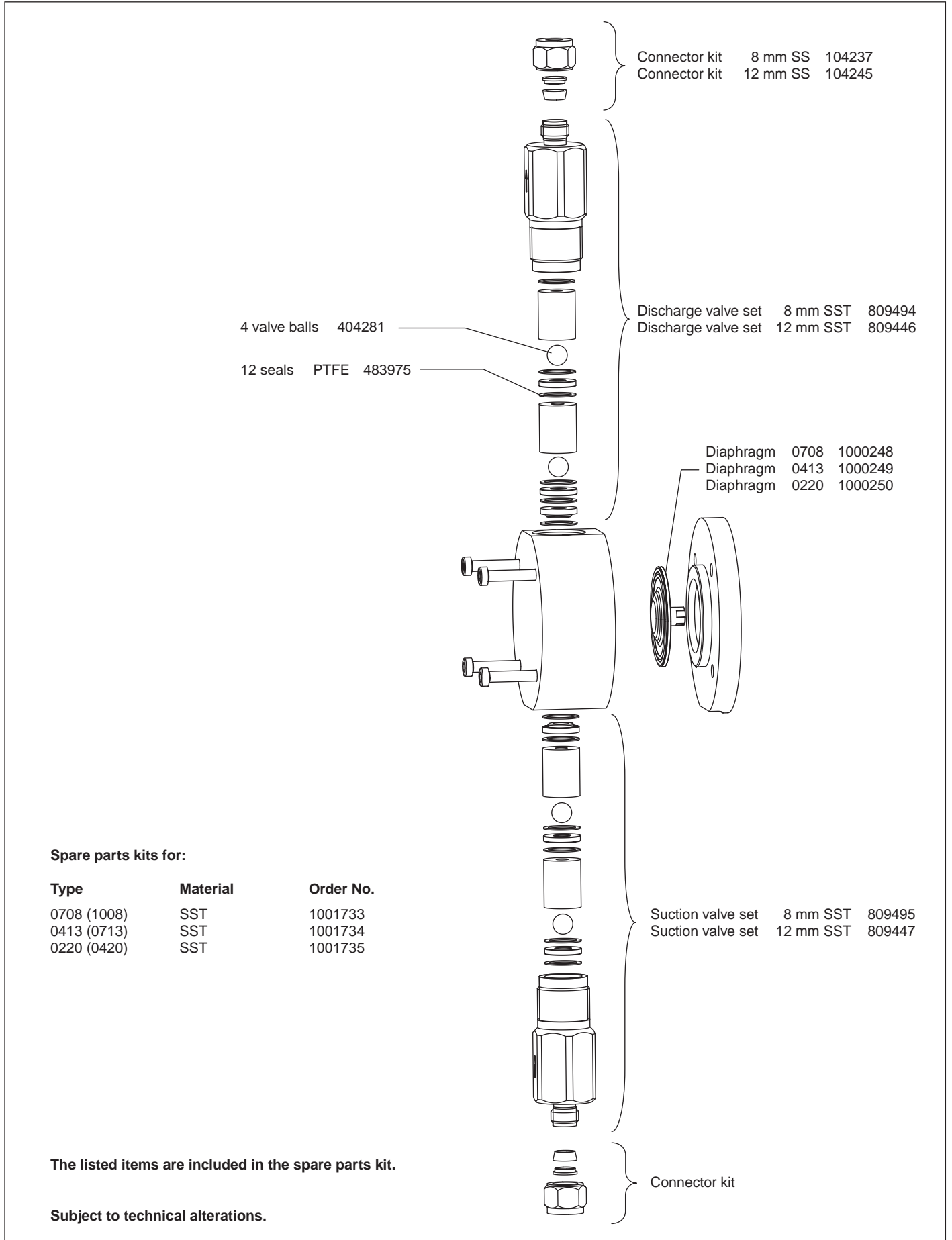
Type	Material	Order No.
1000	SST	1001729
1601	SST	1001730
1602	SST	1001731
1005 (1605)	SST	1001732

The listed items are included in the spare parts kit.

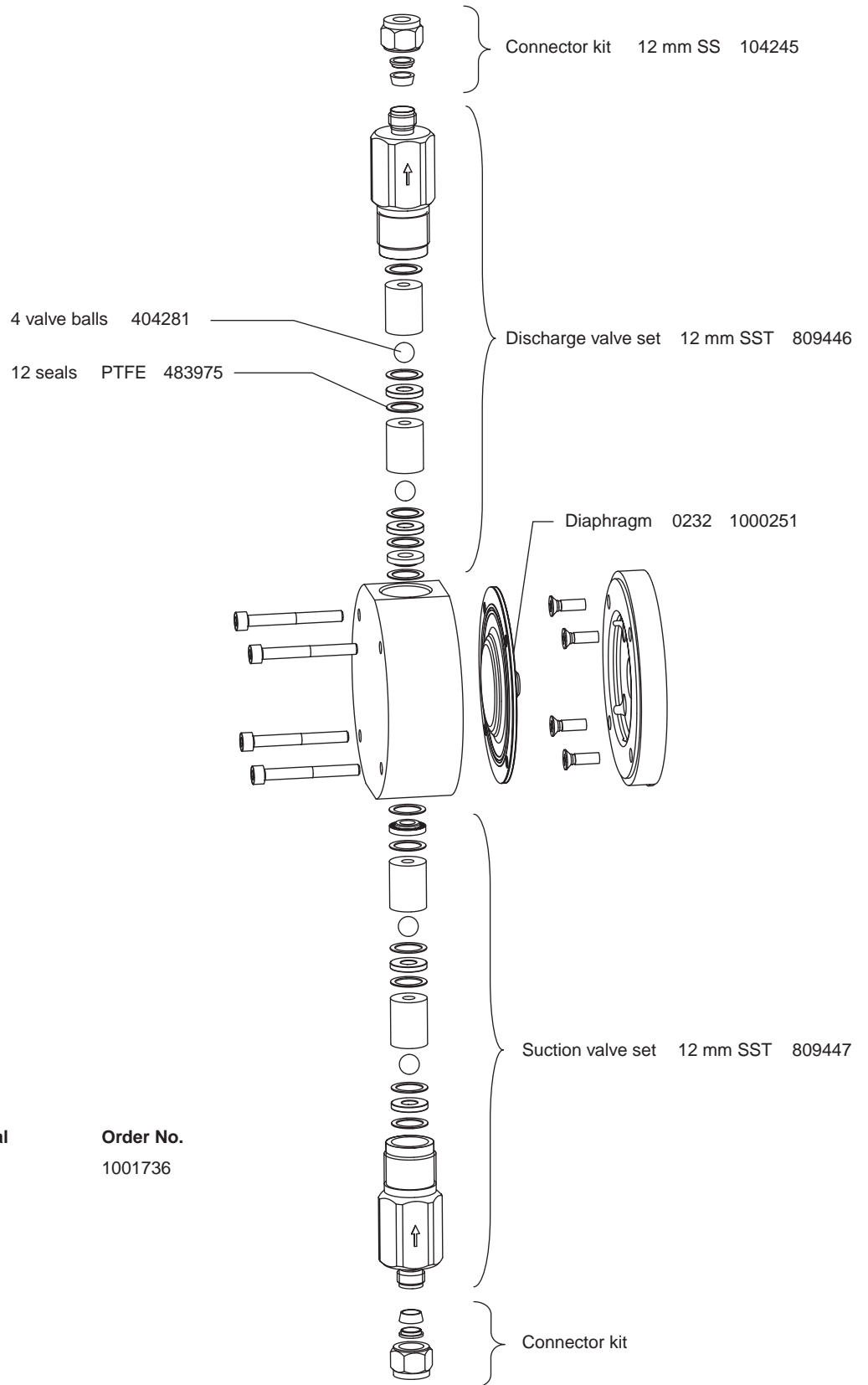
Subject to technical alterations.

Exploded diagrams of liquid ends

Liquid end 0708 (1008) - 0220 (0420) SS



Liquid end 0232
SS



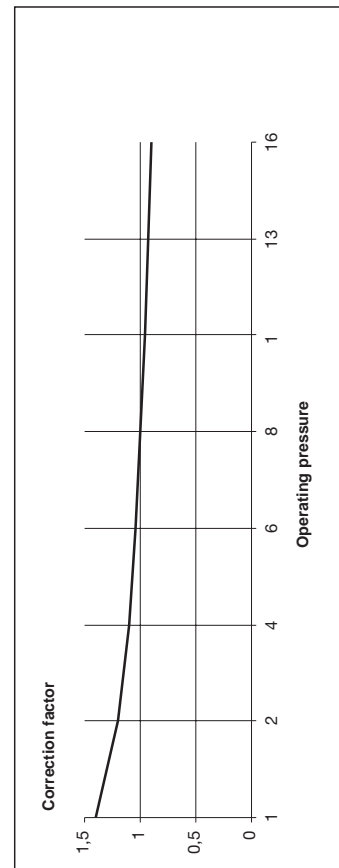
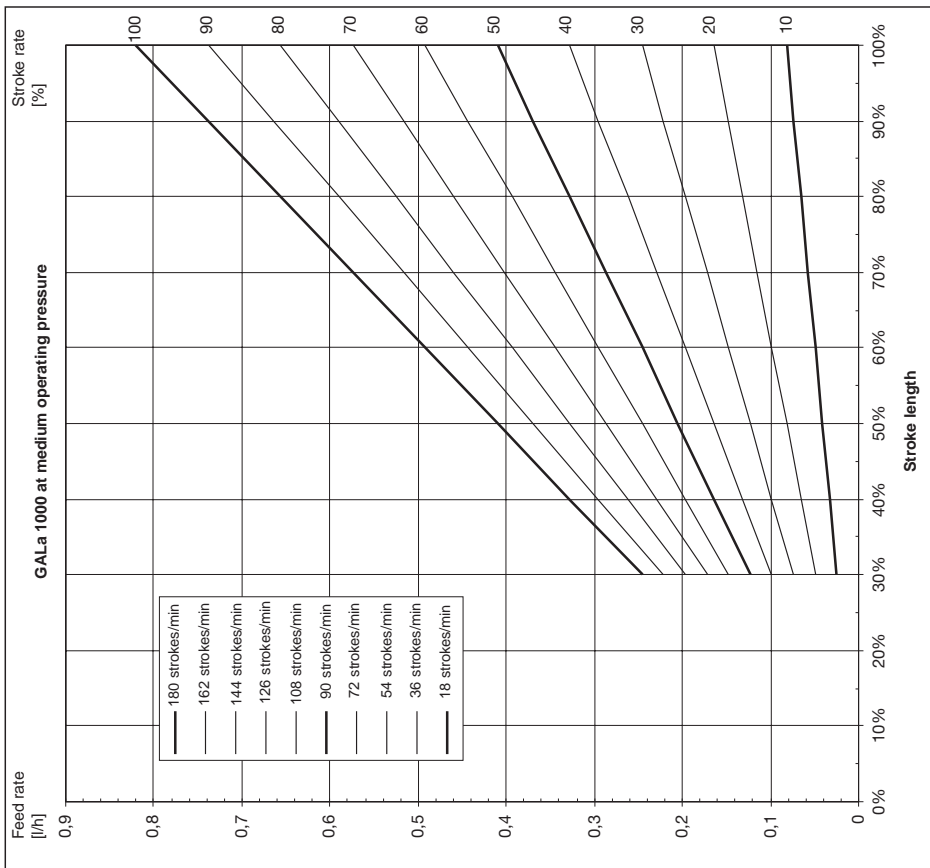
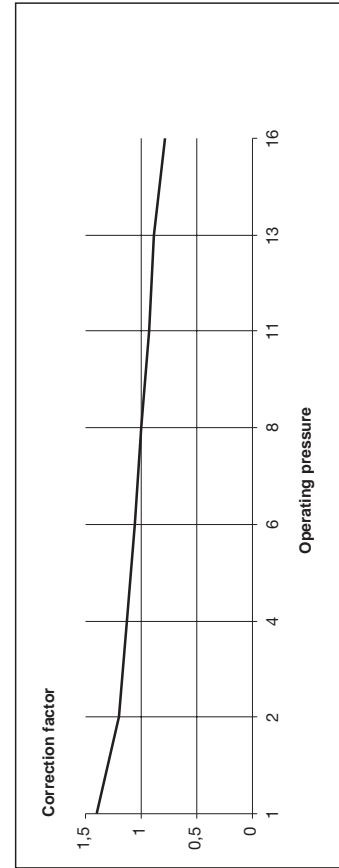
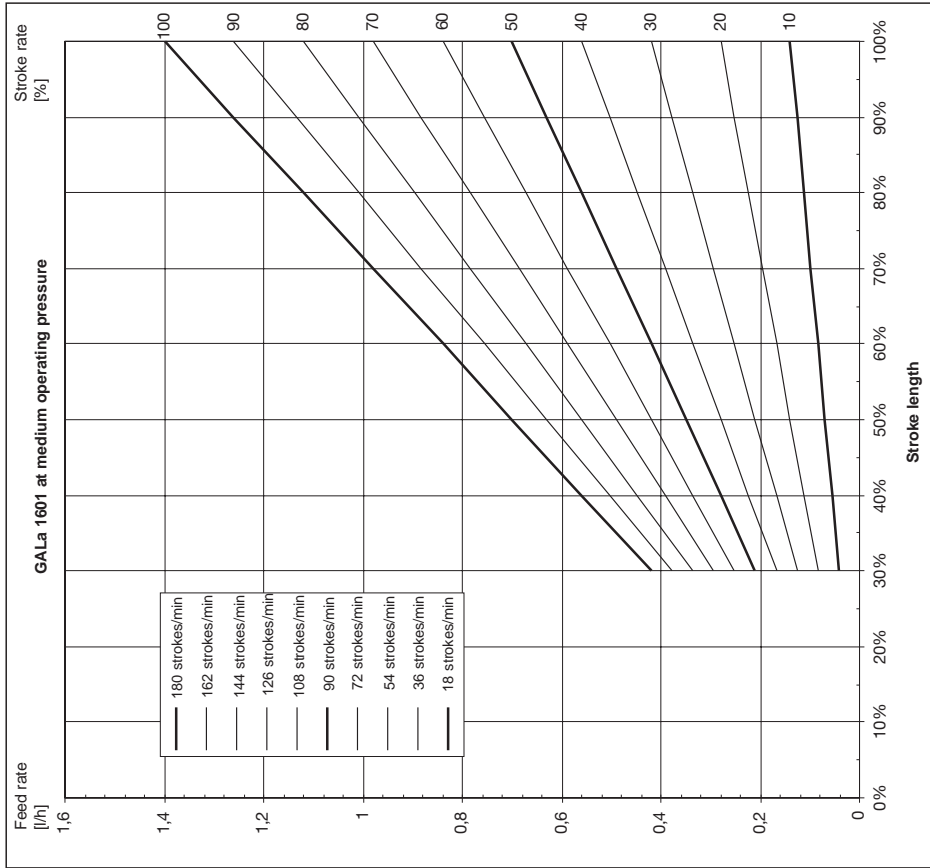
Spare parts kits for:

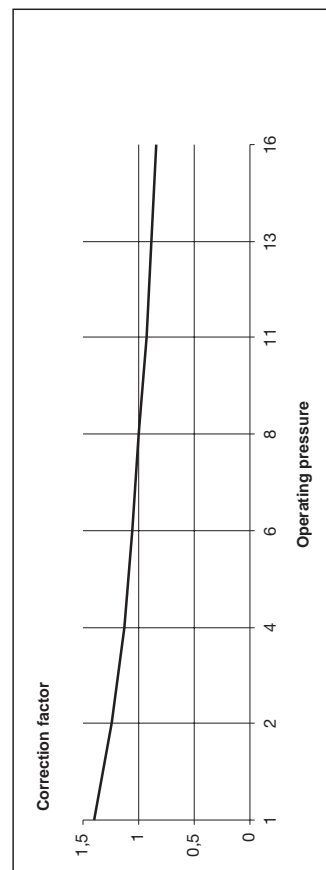
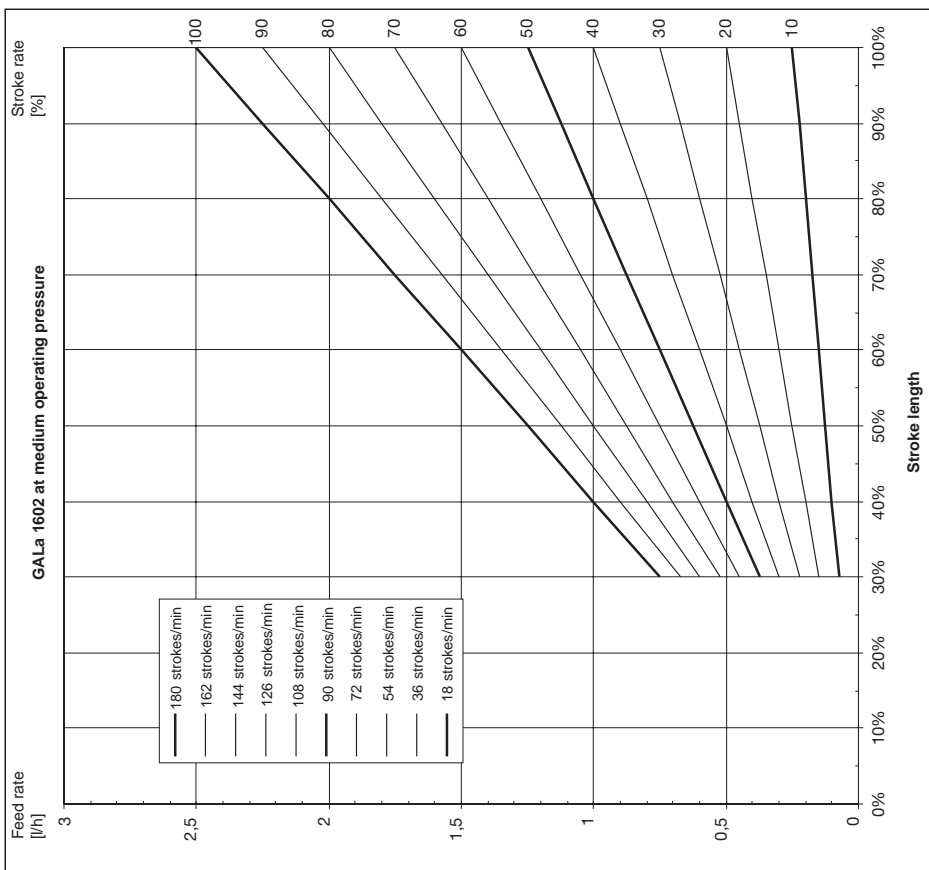
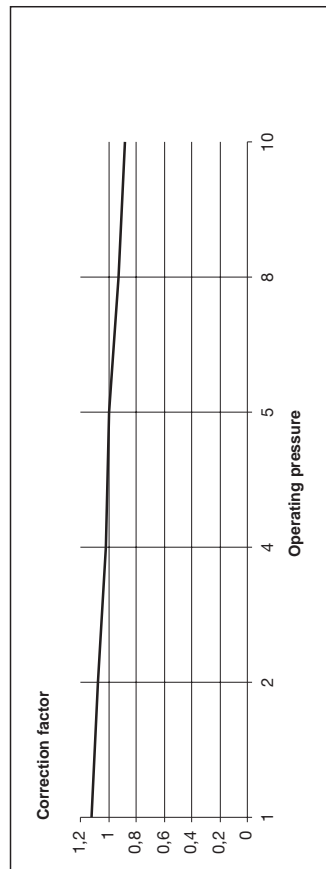
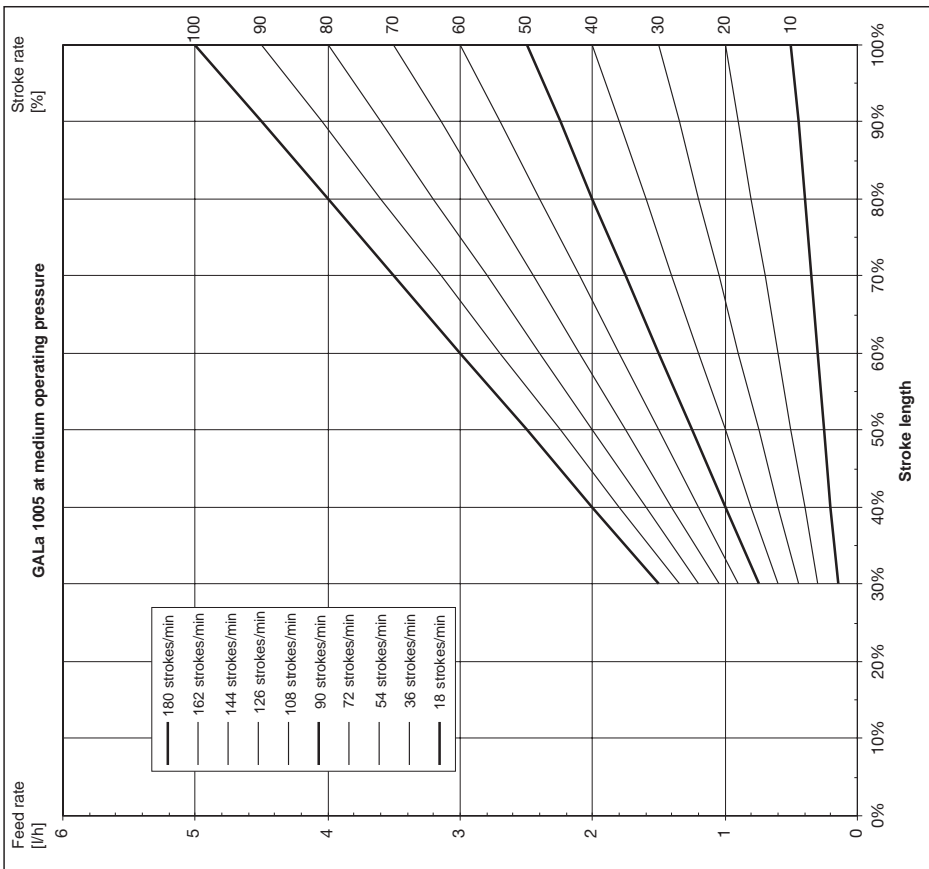
Type	Material	Order No.
0232	SST	1001736

The listed items are included in the spare parts kit.

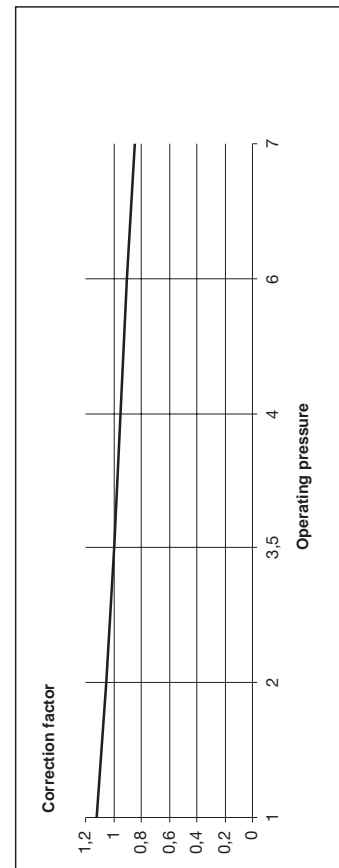
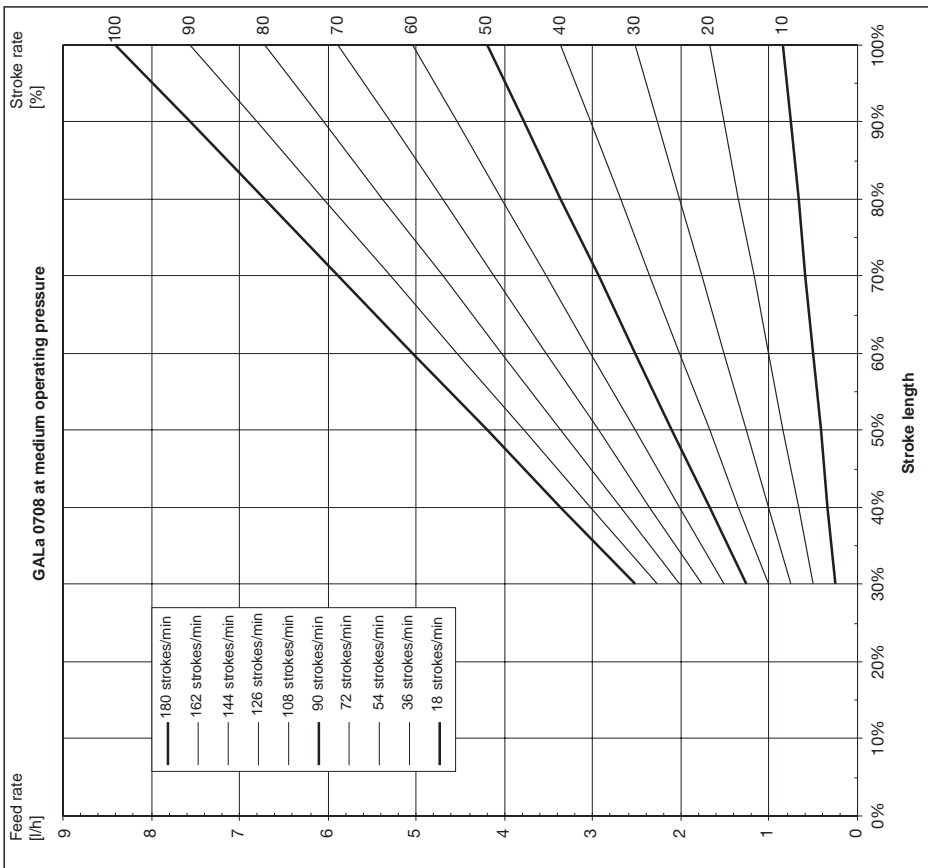
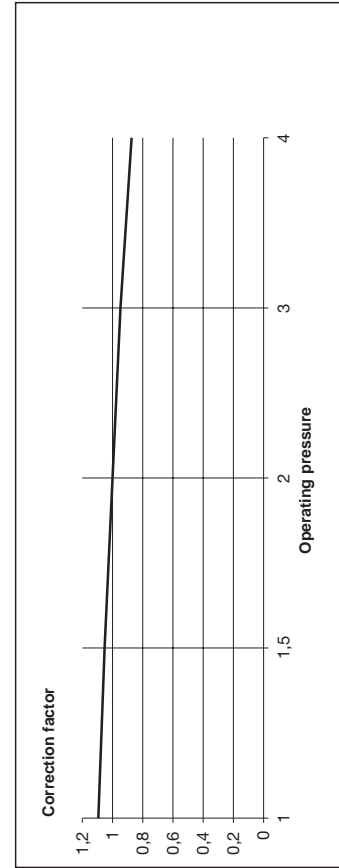
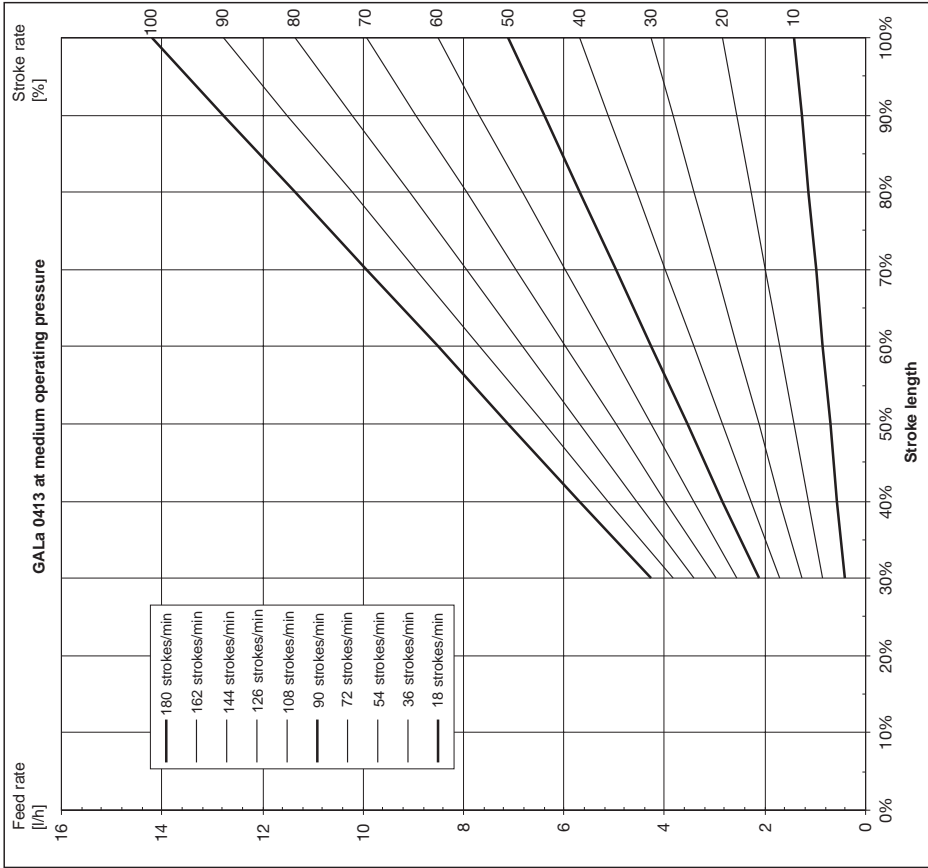
Subject to technical alterations.

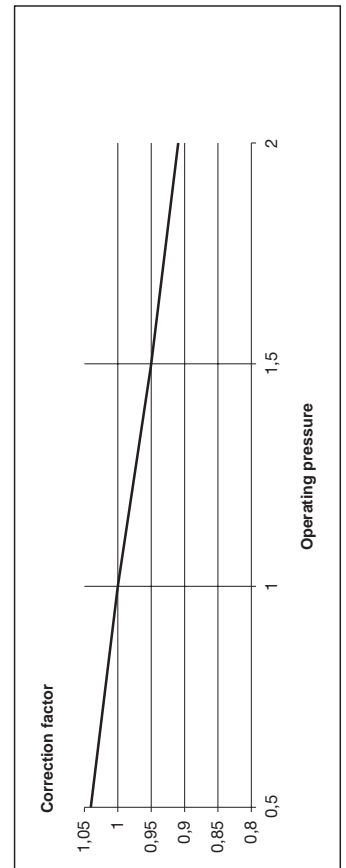
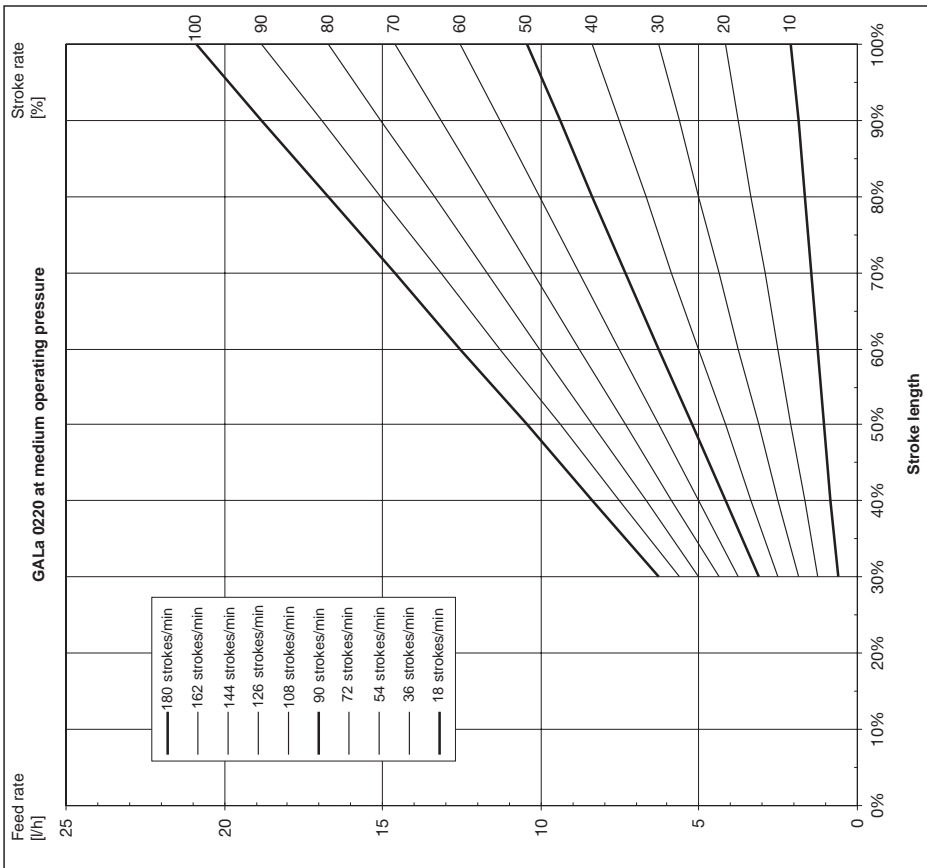
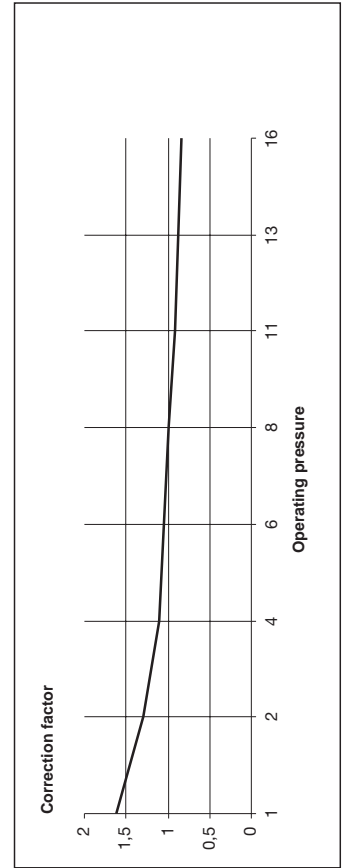
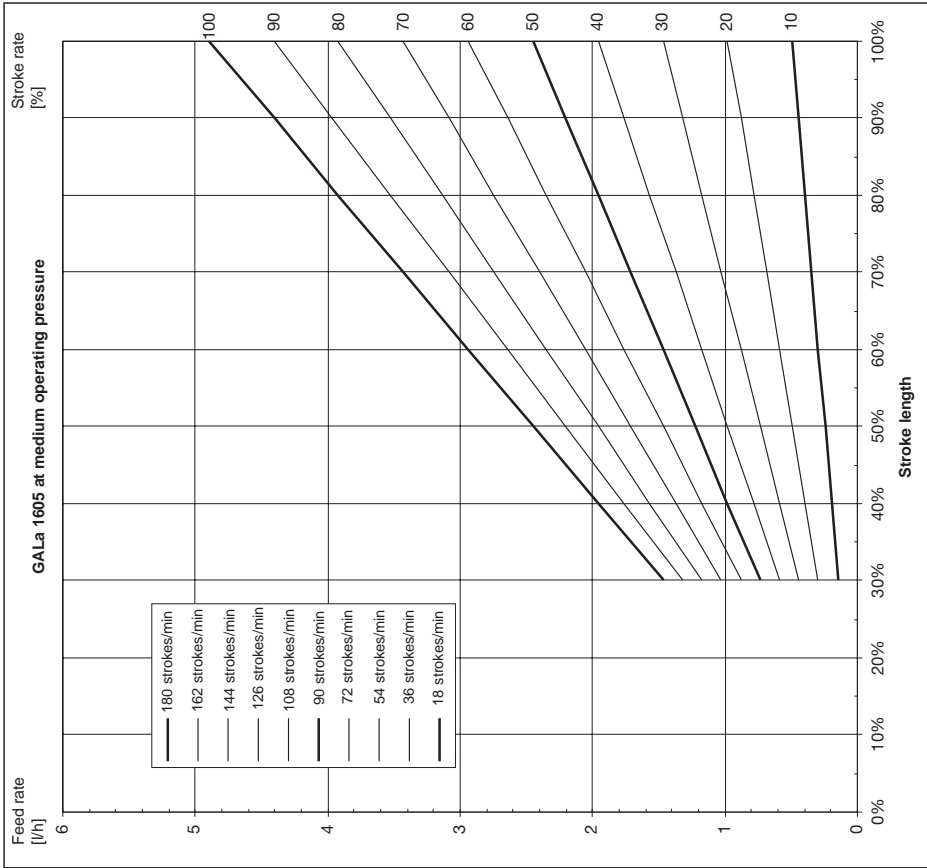
Feed rate settings diagrams



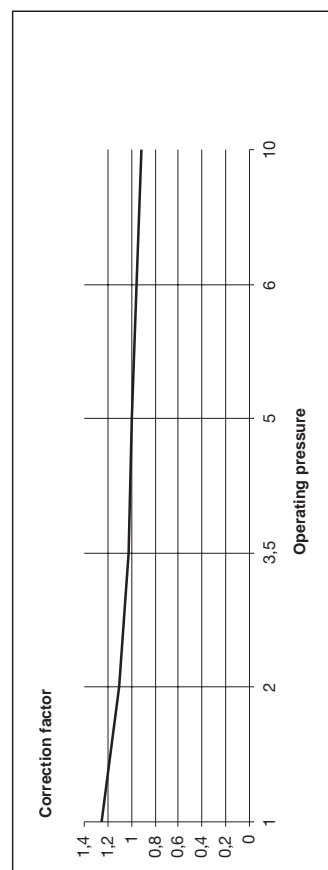
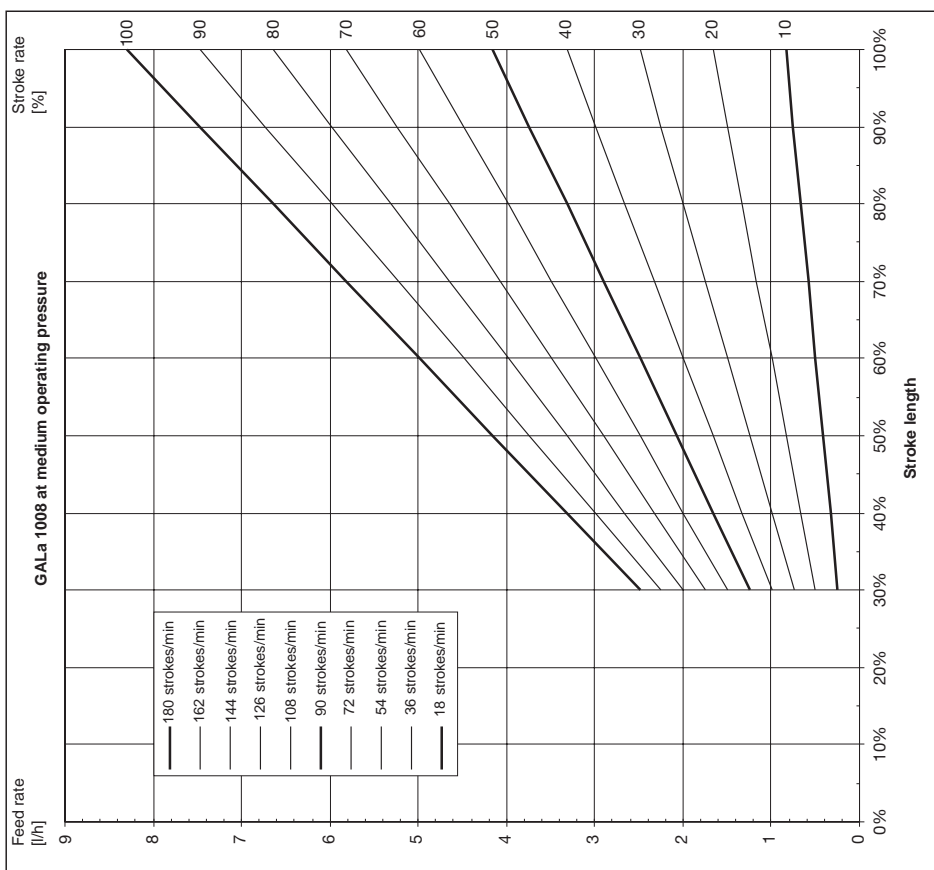
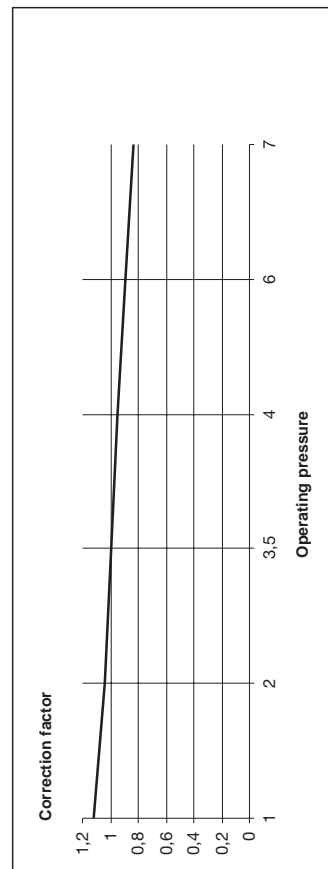
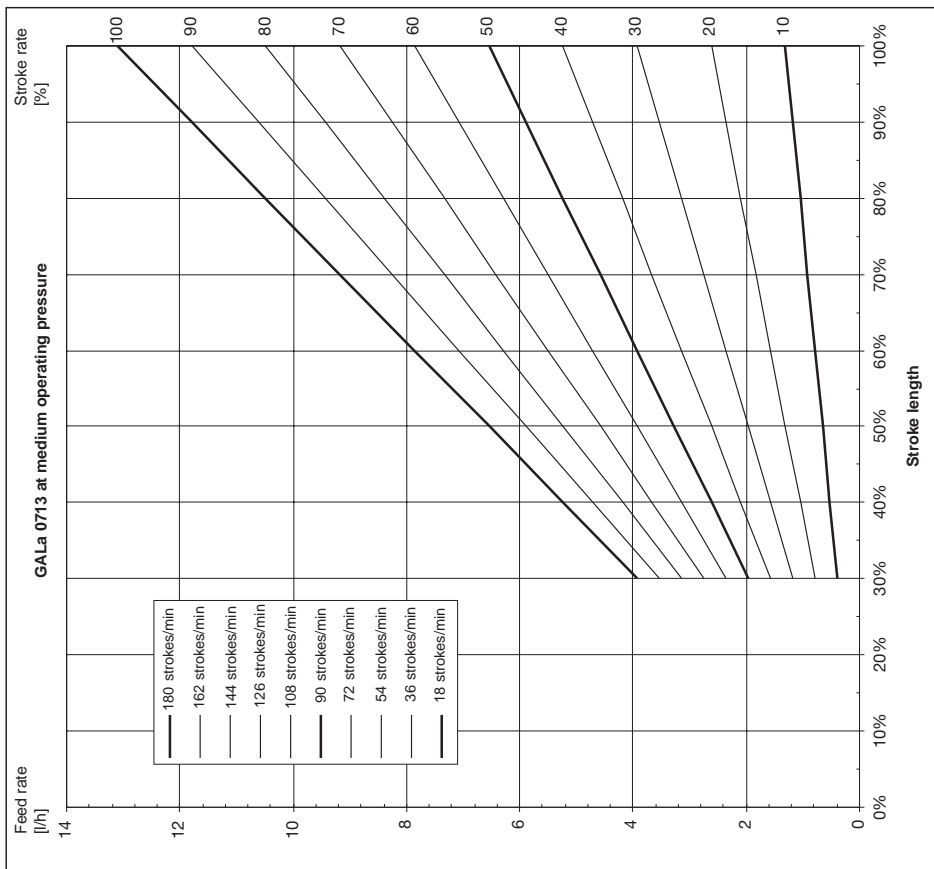


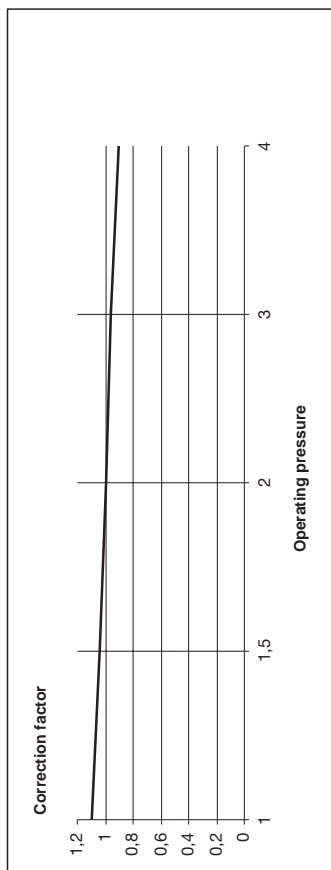
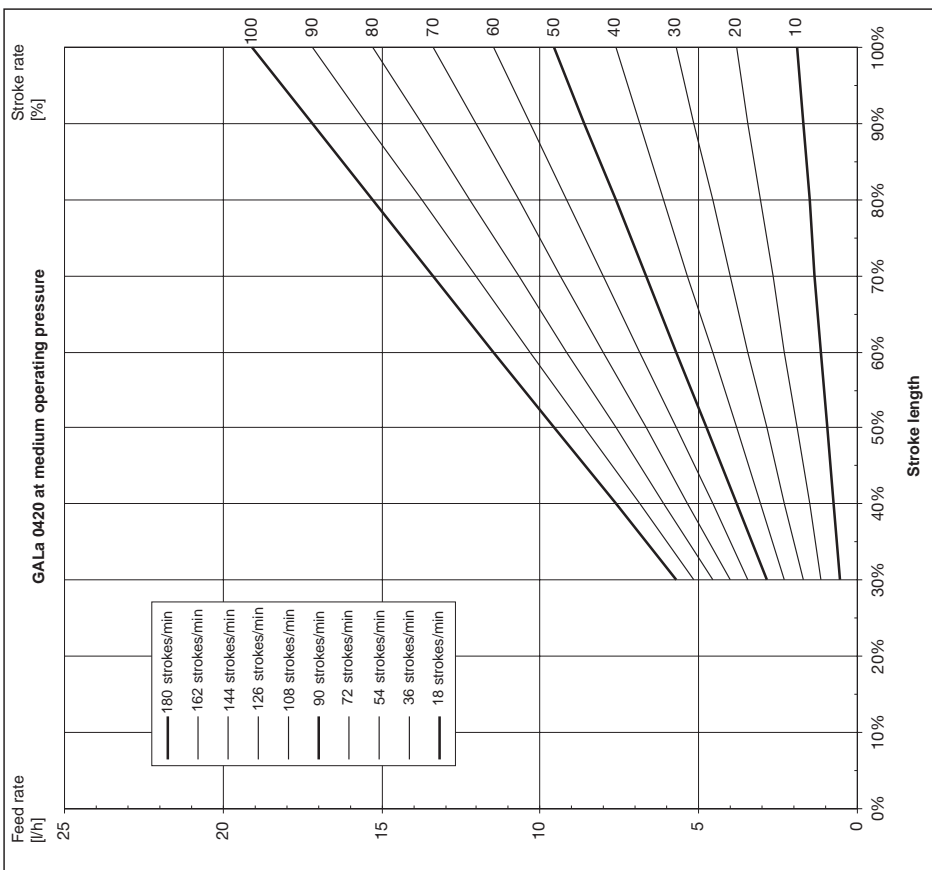
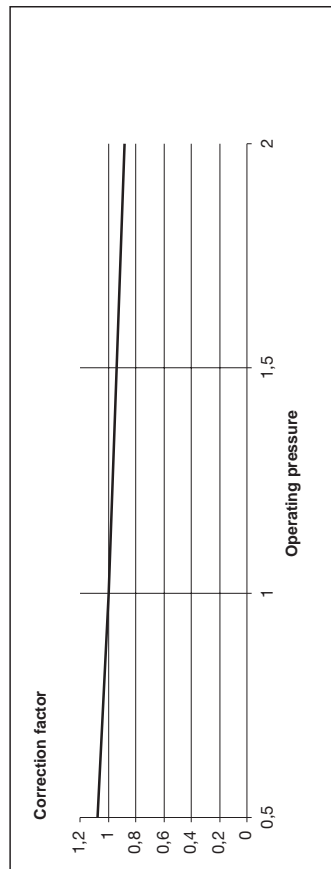
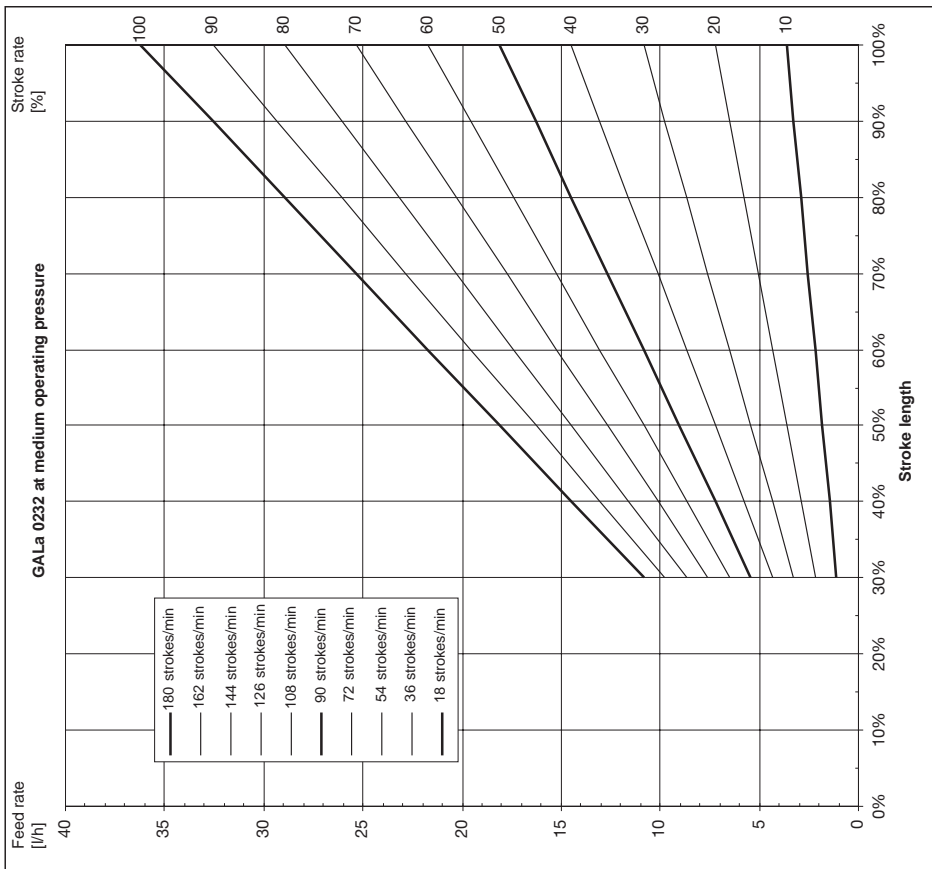
Feed rate settings diagrams





Feed rate settings diagrams





EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.

Any modification to the product not approved by us will invalidate this declaration.

Product description : ***Metering pump, series Gamma L***

Product type : ***GALa***

Serial number : ***see type identification plate on device***

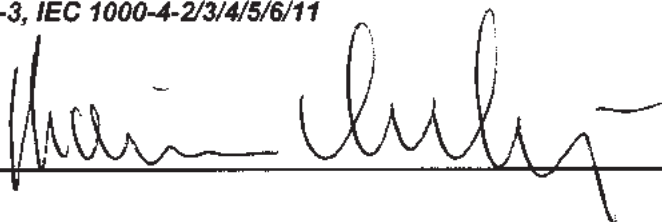
Relevant EC directives : ***EC - machine directive 98/37/EC***
EC - low voltage directive 73/23/EEC
EC - EMC - directive (89/336/EEC) subsequently 92/31 EEC

Harmonised standards used,
in particular : ***DIN EN 292-1, DIN EN 292-2, DIN EN 809***
DIN EN 60335-1, DIN EN 60335-2-41, DIN EN 50106
DIN EN 50081-1/2, DIN EN 55011, DIN EN 61000-3-3
DIN EN 50082-1/2, DIN EN 61000-4-2/3/4/5/6/11

National standards and other
technical specifications used,
in particular : ***DIN VDE 0700 T1***
DIN VDE 0700 T41
DIN VDE 0700 T500
IEC 1000-3-3, IEC 1000-4-2/3/4/5/6/11

Date/manufacturer's signature :

02. Nov 99



The undersigned :

Dr.- Ing. R. Dulger, President

Client:			
Project number:	Date:	<input type="checkbox"/> Sketch supplied:	
Metering pump	Type	-	.....
	Pump capacity	l/h	.....
	Stroking rate	strokes/min	.....
	Stroke length	%	.....
	Valve spring pressure, suction side	bar	.....
	Valve spring pressure, discharge side	bar	.....
Chemicals	Description/concentration	-% /
	Proportion suspended solids/particle size	%/mm /
	Solid material/hardness	-(Mohs scale)	.....
	Dynamic viscosity	mPa s (cP)	.....
	Density	kg/m ³	.....
	Vapour pressure at operating temperature	bar/°C	.....
System: Suction side	Pressure in suction container	bar	.....
	Nominal width, suction line	DN/mm /
	Suction lift min./max.	m /
	Suction pressure min./max.	m /
	Length, suction line	m	.....
	Number of corner bends/valves	-	.....
	Pulsation dampener	<input type="checkbox"/>	with diaphragm ltr.
		<input type="checkbox"/>	without diaphragm ltr.
System: discharge side	Static system pressure min./max.	bar /
	Nominal width, suction line	DN/mm	.....
	Length, suction line	m	.....
	Feed lift	m	.....
	Number of corner bends/valves	-	.....
	Pulsation dampener	<input type="checkbox"/>	with diaphragm ltr.
		<input type="checkbox"/>	without diaphragm ltr.

Guarantee Form

Please copy and send with the gamma/ L!

In the event of failure of the dosing gamma/ L within the guarantee period we request that you return the gamma/ L (cleaned) with a fully completed guarantee application.



Please complete all sections!

Dosing Pump Guarantee Form

No.

Company: Tel. No.: Date:

Address:

Authorised personnel:

Order number: Delivery date:

gamma/ L type/identity code: Serial number:

Brief description of fault:

.....

.....

Fault type

1 Mechanical fault

- Unusual wear
- Worn part
- Break or other damage
- Corrosion
- Damaged in transit

2 Electrical fault

- Loose connectors, e.g. cables or plugs
- Operating elements (e.g. switches)
- Controller

3 Leakage

- Connectors
- Liquid end

4 Poor/no chemical feed

- Defective diaphragm
- Other

ProMinent® gamma/ L operating conditions:

Location/system description:

Pump accessories used:

.....

.....

Commissioned (Date):

Running time (approx. operating hours):

Please enclose customer specification form and sketch of system!

Please copy and send with gamma/ L!

Safety Declaration

We hereby declare that the device enclosed

Type:

Serial number:

is free from hazardous

- **chemicals**
- **biologicals**
- **radioactive substances.**

The device was thoroughly cleaned prior to sending.

Date/signed

Company stamp